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Many avenues. One address.
A Welcome from the Editor

Dear Readers,

Choosing a leading theme is always a difficult decision, due to the diverse and fascinating spectrum that IR occupies. But the decision to focus on women’s health was an easy one – firstly, because this was one of the earliest fields that IR became established in, and secondly, because of the huge impact it continues to have, and the potential it has to do further good.

Women’s health is a broad topic, and while some of the conditions addressed in this issue are mercifully rare, gynaecological and reproductive health is an important consideration for every woman. Childbearing is a basic and essential part of life, but it can also be a complicated process. The excellent prenatal care provided throughout Europe can help identify high-risk cases, but birth is an unpredictable procedure, and any woman can unexpectedly haemorrhage during or following labour: postpartum haemorrhage is still a leading cause of death among young women. It is essential that appropriate treatment is available, and as we show, IR is often a vital part of this treatment.

While postpartum bleeding is the most critical complication, many other diseases can cause severe pain and impaired quality of life for a woman. IQ takes a look at the causes and effects of such debilitating complaints as menorrhagia, uterine fibroids, adenomyosis and pelvic congestion syndrome, as well as a brief overview of breast cancer, and investigates the role of IR in relieving this burden.

This edition features the opinions and analysis of renowned experts, as well as their advice on how to maximise the opportunities that IR presents. The patient voice is also well represented, with a number of women bravely sharing their stories with us.

However, we must also remember what lies behind IR’s success. Like any medical speciality, IR is a collective project fuelled by the hard work of both innovators and implementers, and this edition of IQ also pays homage to both. We speak to IR nurses about their crucial role in patient care, and we interview Kurt Amplatz about his pioneering minimally invasive inventions.

We hope this issue is as fascinating for you to read as it was for us to make!

Jim A. Reekers
Editor-in-Chief
General Information

Interventional Quarter is published three times a year. To add an address to the mailing list, please contact info@intervention-iq.org or refer to www.intervention-iq.org.

Editorial Office
Neutorgasse 9/8
AT-1010 Vienna, Austria
Tel: +43 (0)1 904 2003
Fax: +43 (0)1 904 2003 30
E-mail: info@intervention-iq.org
www.intervention-iq.org

ISSN: 2075-5813

Cover Image © PhotoAlto
Image p. 32 © Credence01 | Dreamstime.com

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Editor-in-Chief
Prof. Jim A. Reekers (Amsterdam, Netherlands)

Managing Editor
Nadja Alomar

Editorial Team
Robert Bauer, Ciara Madden, Adam McLean, Tochi Ugbor

Our thanks to the Contributors
Dr. Adel Ahmed (Nuzha, Kuwait)
Dr. Kurt Amplatz (Plymouth/MN, US)
Prof. Anna Maria Belli (London, UK)
Prof. Louis Boyer (Clermont-Ferrand, France)
Dr. Katerina Fitsiori (Athens, Greece)
Dr. Ricardo Garcia-Monaco (Buenos Aires, Argentina)
Dr. Nestor Kisilevsky (São Paulo, Brazil)
Ms. Ioanna Kotsioumpa (Athens, Greece)
Dr. Thomas Kroencke (Berlin, Germany)
Ms. Rita Ling (London, UK)
Ms. Patricia Liuzzo (Rome, Italy)
Dr. Paul Lohle (Tilburg, Netherlands)
Dr. Lindsey Machan (Vancouver/BC, Canada)
Mr. Isaac Manyonda (London, UK)
Dr. Anthony Nicholson (London, UK)
Ms. Virginia Norton (Bremen, Germany)
Dr. Franco Orsi (Milan, Italy)
Dr. Keigo Osuga (Osaka, Japan)
Dr. Jean-Pierre Pelage (Boulogne, France)
Dr. Donald Robertson (Geelong/VIC, Australia)
Dr. Raman Uberoi (Oxford, UK)

Graphical Design
LOOP.ENTERPRISES media EU / Austria
www.loop-enterprises.com

An invitation to our readers
IQ is your magazine, and we would welcome your views and your news. Readers who wish to comment on any of the issues raised (or who would like to raise any of their own) are most welcome to submit letters to the Editor. Likewise, if you have any promotions, awards, honorary lectures or other tit-bits you’d like to share with the interventional community, please send them to us by post or by email.

We look forward to hearing from you!
IQ Editorial Team

Email: info@intervention-iq.org
Write to: Neutorgasse 9/8, AT-1010 Vienna, Austria
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Women’s Health

From complications in pregnancy and childbirth, to management of both malignant and benign tumours, interventional radiology (IR) is increasingly making a real difference to the medical care of women, saving and improving countless lives.

The latest image-guided minimally invasive interventions are sparing more and more women from the disfiguring treatments of the past, helping to preserve fertility and keep bodies intact.

It is no wonder that so many patients are showing interest in the less invasive treatment options of IR and with informed consent now an essential component of modern medical practice, access to information has become a major theme.

All patients require appropriate support and the only way the optimal therapy can be chosen in each case is through a collaborative, multidisciplinary approach with consideration of all the options.

The greater the range of treatments available the better, and the arsenal of effective therapies for many conditions and diseases affecting women is strengthened by IR.
Introduction

IR the key to less aggressive therapy

IR interventions are expanding into an impressive range of areas within women’s health. Both rare and common conditions affecting all ages are a target for innovative minimally invasive procedures.

Aggressive and invasive procedures involving complete removal of body parts are thankfully becoming increasingly rare. Hysterectomy, once the preferred treatment for so many gynaecological complaints, is no longer a first-line treatment in many cases and more women are now able to retain their uterus thanks to uterine artery embolisation for fibroids and adenomyosis.

Likewise, the trend away from destructive surgery towards conservative management of breast tumours is supported by developments in minimally invasive strategies which reinforce the repertoire of techniques that are used to combat cancer.

Reproductive health

Worthy of particular note is the impact IR has upon reproductive health, namely complications in pregnancy and childbirth and associated female fertility. Postpartum haemorrhage and invasive placenta can be challenging to manage and the ability of interventional radiologists to effectively stop bleeding in a targeted manner with embolisation is playing a vital role in making the tragedy of maternal death less common. In some cases uterine function can be spared, providing a chance that fertility may also be preserved. Most gynaecologists now try to avoid damage to the uterus if possible, so referrals to IR for embolisation are on the rise.

IR also has other methods that can help when fertility is impeded due to specific causes, for example selective salpingography which can assist fertility by clearing blocked fallopian tubes.

Collaboration best for everyone

Growing numbers of specialists, including gynaecologists, are experiencing the benefits IR can offer through participation in a collaborative approach to patient care. A synergy of all available experience and training not only provides the best for the patient but also enriches professional practice and encourages a good training environment for the next generation of doctors (see page 20).

Although an IR treatment will not be appropriate in every case, patients expect and have a right to discussion and consideration of all the options. The classical picture of doctors exclusively treating their patients without the involvement of other specialties is becoming a thing of the past.

Good for the hospital

Indeed, those centres that are built upon greater interdisciplinary collaboration have found that patients vote with their feet, in appreciation of an open environment where all options are available. When UFE has been added to the repertoire of more traditional treatments, uterine fibroid clinics have seen an increase in demand overall, including gynaecological and surgical services.

As IR represents the cutting-edge of medical development, hospitals have nothing to lose and everything to gain in the future by supporting interdisciplinary teamwork.

Cost efficient

IR therapies do not only benefit hospitals in terms of increased caseload. Minimally invasive treatments typically have shorter recovery times and lower complication rates which translate into more efficient treatment and cost savings. A patient undergoing UFE, for example, will have a hospital stay of only one or two days and will usually return to her routine lifestyle within two weeks. This is a clear advantage to the patient, the hospital and the system as a whole.

A bright future

The minimally invasive approach to women’s health has been steadily gaining popularity over the years, and with a solid body of evidence to support its use, this trend seems set to continue (see pages 18-19 and 36-37 for details of trials).

Uterus-sparing treatments are not just beneficial to women of child-bearing age. Alongside the physical trauma of hysterectomy and the impact that it can have on sexual function, many women who lose their uterus suffer very real and very traumatic psychological outcomes. The threat of losing a defining feature of their femininity can prevent many women from seeking the medical help they need.

In providing these women with an option that retains their physical integrity and sense of femininity, IR opens the doors for more women to seek and find solutions to their problems, and with further innovations underway, the future looks brighter still.
Menorrhagia

Excessive and prolonged menstrual bleeding over a number of regular monthly cycles.

- Affects 10-30% of women.

Women affected by menorrhagia experience a huge and immediate impact upon their quality of life that makes this condition a socially as well as physically debilitating burden. The sheer number of women affected and the risk of medical complications such as anaemia mean that menorrhagia is a key area in which IR is making a real difference to women’s health and wellbeing.

Clinical definitions tend to describe menorrhagia as over 80ml menstrual blood loss, or menstruation lasting longer than seven days. In practice, however, symptoms vary from case to case so what constitutes excessive bleeding is defined by the patient herself, according to how her quality of life is affected.

Causes

In the past, the possible causes of menorrhagia were not well differentiated and definitive treatment entailed hysterectomy. Modern imaging and diagnostics allow a clearer recognition of the distinct pathologies that can underlie the condition. Uterine fibroids and adenomyosis are two common conditions of which menorrhagia can be a symptom.

- **Uterine fibroids** are benign tumours, consisting of fibrous tissue and smooth-muscle, which can form at various sites in the uterus.

  They are the most common tumours of the female reproductive tract and may go unnoticed. However, larger and more troublesome fibroids can cause menorrhagia, swelling and pain, with an immense drain on a woman’s social and mental health.

- **Adenomyosis**, also known as internal endometriosis, occurs when functioning uterus lining (endometrial tissue) is present in the outer muscular walls of the uterus (myometrium) causing swelling and thickening of the uterus wall.

  Adenomyosis can be diffuse or focal (adenomyoma). Heavy menstrual bleeding occurs due to the affected parts of the uterine wall behaving like endometrium during menstruation. Adenomyomas are sometimes misdiagnosed as fibroids as the two conditions can be present side by side, cause similar symptoms, and can be tricky to distinguish when imaging.

Types of adenomyosis

- **Unaffected uterus**

![Normal junctional zone](image1)

- **Focal thinining of junctional zone**

![Thickened junctional zone](image2)

- **Unaffected uterus**

![Normal junctional zone](image3)

- **Focal adenomyosis**

![Focal thinining of junctional zone](image4)

- **General adenomyosis**

![Thickened junctional zone](image5)

- **Both adenomyosis and fibroids present (adenomyosis dominant)**

![Both adenomyosis and fibroids present](image6)

- **Both adenomyosis and fibroids present (fibroids dominant)**

![Both adenomyosis and fibroids present](image7)

Fibroids can occur at many different sites in the uterus.

© 2003 John Yesko. Image courtesy of Merit Medical, Inc.
Menorrhagia

IR treatment
Uterus-sparing, minimally invasive treatments are available for those cases where excessive bleeding persists despite medication.

Uterine artery embolisation (UAE), or uterine fibroid embolisation (UFE), is already well established as a treatment for uterine fibroids and since its introduction has provided relief for many thousands of uterine fibroid sufferers.

For the treatment of adenomyosis, UAE has traditionally been thought of as less effective, although this is in comparison to the great success of the technique for managing fibroids. The procedure may yet be optimised for adenomyosis through specific innovation and research (see New Horizons, page 34).

UAE to treat uterine fibroids:
- The interventional radiologist inserts a catheter into the femoral artery through a small nick in the skin.
- The catheter is guided into the uterine artery that is supplying the fibroid with blood.
- Special embolic particles are injected which cut off the blood supply. The fibroid shrinks and dies.

© 2000 John Yesko. Image courtesy of Merit Medical, Inc.

Advantages of HIFU
- No ionising radiation
- Non-invasive procedure
- Only mild discomfort
- Quick return to everyday activities

HIFU is ripe for further development and it is hoped that with advancing technology and increasing clinical experience the technique will not only become more efficient in the treatment of fibroids but may also prove a useful option for managing focal adenomyoma (see page 15).

Surgical treatment
Endometrial ablation employs a source of heat such as microwaves, laser, or hot fluid to destroy the lining of the uterus, whilst leaving the rest of the organ intact. The procedure is, however, not recommended for those wishing to become pregnant in the future, and is not always suitable when fibroids are present or when adenomyosis runs to deeper levels of the uterine lining.

Myomectomy (also known as fibroidectomy) might be performed in cases where uterine fibroids are the identified cause of menorrhagia. Depending on various factors including fibroid size, this surgical removal of fibroids can be carried out abdominally, laparoscopically, vaginally or hysteroscopically.

Hysterectomy, although remaining a useful final option for menorrhagia, is considered unacceptable as a first-line treatment by a growing number of women and doctors. Removal of the uterus is an irreversible surgical procedure with far-reaching consequences. Although very effective in treating menorrhagia, hysterectomy is not always free from unwanted effects and complications.

The availability of other treatment modalities has helped reduce the number of hysterectomies performed. Nevertheless, hysterectomy is not a thing of the past and it remains one of the most common operations in women.

Furthermore, many women still do not receive adequate explanation of all the possible treatment options, including minimally invasive techniques which may be more suitable, carry fewer risks, and can spare a woman needless loss of her uterus.

IR makes a difference
For many women, the uterus is not only linked to fertility but is a vital and intrinsic part of their body, so the minimally invasive uterus-sparing interventions that IR provides are of special value. The availability of these alternatives means that women and their physicians have a range of options for treating menorrhagia to suit the individual lifestyle, medical condition and fertility wishes of the patient.
Pelvic Congestion Syndrome (PCS)

Bulging veins in the pelvic region, caused by dysfunction of the venous valves.

- It is estimated that in their lifetime, one in three women will suffer from chronic pelvic pain.

UFE and adenomyosis are unfortunately not the only sources of pelvic pain – non-cyclical pain lasting longer than six months. There are a number of possible causes for this, such as endometriosis or ovarian cysts. Pelvic congestion syndrome is perhaps the most under diagnosed of all these complaints, due to varicosities of the pelvis being so hard to detect. For many years, women with chronic pelvic pain who did not show any signs of cysts, fibroids or endometriosis were dismissed as having a psychosomatic disorder, and with mental instability being the diagnosis, no effective treatment programme was offered for their pain.

Causes

Veins are designed to return blood to the heart against gravity, with valves to stop the blood flowing backwards. When these valves are weakened, the blood begins to pool in the vein, causing pressure and bulging. Pelvic veins are especially vulnerable:

- They are thin-walled and unsupported
- Oestrogen (produced by the ovaries) can weaken the vein walls
- Pregnancy leads to a massive increase in blood flow to the region, and can trigger valve incompetence

Symptoms

There are a wide variety of symptoms that may be experienced:

- Dysmenorrhea (excessive menstrual pain)
- Dyspareunia (pain during sex – experienced by 71%)
- Postcoital ache (65%)
- Bladder irritability or stress incontinence
- Perineal pain
- Bowel trouble
- Vulvar, buttock or upper thigh varicosities
- Tenderness in lower abdomen
- Backache
- Lethargy/depression
- Swollen vulva

Most of these symptoms are a direct result of the bulging vein pressing on an adjacent organ, such as the bowel or bladder, and are made worse by prolonged standing, walking, bending, lifting and sex. The pain tends to increase during the day, and before or during menstruation. Depending on the symptoms experienced, a patient may present to a gynaecologist, vascular surgeon or urologist for consultation.

Diagnosis

Pelvic congestion syndrome is generally missed under routine imaging. Often, a diagnosis is only reached after eliminating other possibilities. It is not surprising that so many women remain undiagnosed so long – traditional imaging exams are performed in a supine position, which takes the pressure off the affected veins. When lying down, blood need no longer struggle to return to the heart, and the bulging that accompanies pelvic congestion syndrome is not visible. Standing or performing the Valsalva manoeuvre (holding breath and pushing it down into the abdomen) during imaging can improve visualisation, but as PCS is rarely considered, this is rarely performed.

For many years, women with chronic pelvic pain (and undiagnosed PCS) were dismissed as having a psychosomatic disorder

PCS most commonly occurs in women of child-bearing age who have had at least one pregnancy – it is thought that increased vascularity, weight gain and hormonal changes all play a contributing role. It can also be caused by a congenital lack of venous valves, but this is rare.
Pelvic Congestion Syndrome

**IR treatment**

There is no definitive treatment for PCS, due to the variability of symptoms, discomfort and location of the varicosity. A number of treatments have been tried over the years, with embolisation achieving the greatest success.

**Embolisation**

Embolisation seems to be the most effective treatment available, with studies citing effective relief ranging from 60%¹ to 95%² of patients.

The procedure:
1. A catheter is inserted at the groin and fed to the site of the problem (ovarian or internal iliac veins).
2. Tiny coils, sometimes along with a sclerosing agent, are delivered, plugging the faulty vessel.
3. This prevents such a large volume of blood from entering, and allows the varicosities to eventually subside.
4. Usually requires an overnight stay, and patients may experience post-embolisation syndrome (pain, nausea or fever – see page 28) for a day or two.

Pain improvement may take a number of weeks, but the majority of patients receiving this treatment does report an improvement in their condition as a result, in drastically higher numbers than is reported for other treatments.

Other advantages:
- no surgical incision
- no risk of general anaesthetic complications
- no impact on fertility
- minimal downtime following the procedure
- complication rate less than 4%

**Conservative treatment**

Conservative treatments did not prove very successful:

- Injection of vasoconstrictors to reduce diameter of veins (largely discontinued)
- Injection of hormone treatments to reduce ovarian function (largely discontinued)
- Pain relief and anti-depressants (limited success)

The high failure rate of these treatments led desperate patients to try unusual treatments such as transcutaneous electrical nerve stimulation, trigger point injections, acupuncture, counselling and epidurals and spinal nerve blocks, mostly without success.

**Surgical treatment**

Surgical methods have not had good results either, and these days are usually used as a last resort.

- Removal of pelvic adhesions
- Anatomical corrections of a displaced uterus
- Ligation of veins (significant symptomatic improvement, but technically challenging)
- Hysterectomy (with or without bilateral oopherectomy)

Even following such a drastic step as hysterectomy, symptoms can persist.

A number of treatments have been tried ... with embolisation achieving the greatest success

**Offering hope**

Although there is still no definitive cure for pelvic congestion syndrome, evidence shows that embolisation provides significant relief for the majority of sufferers, and it is therefore a treatment that patients should be advised of. To hear one lady’s story of how IR improved her life, please turn to page 32.

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¹ Anne Roberts, “Pelvic Congestion Syndrome”, CIRSE Congress Newspaper 2010, Saturday edition
² www.sirweb.org/patients/chronic-pelvic-pain/
Postpartum Haemorrhage

Heavy bleeding during or following childbirth, which may be life-threatening.

- 24% of maternal deaths worldwide are caused by postpartum bleeding. In developing countries, this figure rises to a shocking 60% (WHO data).
- Embolisation has a 90% success rate in patients who do not have blood clotting disorders.

Postpartum haemorrhage is characterised by:

- blood loss in excess of 500ml during a vaginal delivery OR
- blood loss of more than a litre during caesarean section OR
- a reduction of haemocrit level by 10% or more between admission and birth

Death can occur either from blood loss directly, or from complications arising from interventions to stem the bleeding. It is estimated that 1% of deliveries are complicated by severe bleeding.

Causes

There are many reasons why postpartum bleeding may occur:

1. **Uterine atony**
   By far the most common cause, accounting for 80% of cases. The muscles of the uterus do not contract as usual, a process which helps compress blood vessels and reduce flow. This muscle exhaustion can be caused by prolonged labour, over-distension of the womb (large or multiple babies; excessive amniotic fluid), drugs given to induce labour or manage pregnancy complications such as pre-eclampsia (high blood pressure), or bacterial infections (rare, but more likely following a long labour, or multiple vaginal exams during last month of pregnancy).

2. **Genital tract laceration**
   Injury to the cervix, uterus or vagina is the second most common cause of postpartum haemorrhage. Increased vascularity occurs during pregnancy, which can be damaged by extensive manual exploration or instrumentation, which are most commonly needed in cases of abnormal placentaion.

3. **Retained/adherent placenta**
   Prevents adequate contraction of womb and attendant blood flow reduction (see section on Invasive Placenta, page 12).

4. **Maternal coagulopathies**
   Blood clotting disorders in the mother may be pre-existing or acquired during pregnancy, and can complicate otherwise manageable postpartum or trauma bleeding.

   The majority of cases are unpredictable, unless an underlying condition such as placenta praevia or placenta accreta have been discovered (see page 12).

**IR treatment**

**Embolisation and Balloon Occlusion**

The favoured treatment in most developed countries is currently IR. Embolisation has been used in treating postpartum haemorrhage since 1979, and has several advantages over surgical methods, as catheters can be placed more distally and embolisation can be performed more selectively.

In recent years, the use of balloon occlusion has also been employed, especially in those patients who are expected to undergo major bleeding (e.g. placenta praevia patients). Pre-operative placement of occlusion balloons was first described for the aorta in 1995, and was soon adapted for the treatment of postpartum bleeding.

- Catheters are placed in the internal iliac arteries.
- Following the cutting of the umbilical cord, balloons can be inflated, blocking the blood supply.
- If this is not sufficient to regain haemostasis (or if balloons are not being used), embolisation can be performed, providing a semi-permanent barrier to the flow of blood.
- Gelsponge is the most commonly used agent, as this can be absorbed by the body within about six weeks, meaning that no vessels are permanently occluded.

Embolisation is successful in around 90% of cases. Secondary embolisation may be needed in 9-14% of cases. Complications are rare, occurring in less than 6% of cases, and most commonly appear as infection or non-target embolisation.

The procedure does not appear to affect the patient’s fertility, and most resume menstruation three to four months following the procedure. Post-embolisation syndrome (pain, fever) may be experienced, but usually lasts only two to three days (see page 28).
Postpartum Haemorrhage

Conservative and surgical treatment

A number of treatments have been tried over the years, ranging from a conservative option of administering haemostatics and uterotonics (to stop bleeding and induce contraction of the uterus, respectively) while packing the vagina to reduce blood flow, to major surgical interventions. Surgical options range from ligation (tying) of the uterine vessels, to cutting off all blood flow and removing the womb, which has a high morbidity and loss of fertility. These are not always effective measures though – packing and ligation have a high failure rate, due to the extensive network of interconnected blood vessels in the pelvis, and even with as drastic a measure as hysterectomy, bleeding can be hard to suppress.

The staggering benefits of IR

IR clearly has much to offer medical teams who seek to manage postpartum bleeding. In reducing or stopping excessive bleeding, whatever the cause, IR has allowed countless young mothers to retain their wombs, avoid blood transfusions and most importantly, has saved lives. A young woman losing her ability to have further children is devastating – a young family losing their mother is even more crushing. The evidence shows that IR can play a major role in reducing both these tragic outcomes, and its incorporation into maternity hospital protocol can help improve the chances of a young family having the best start possible.

The favoured treatment in most developed countries is currently IR

2 Postpartum Hemorrhage in Emergency Medicine, Maame Yaa A B Yiadom, Pamela L Dyne, Daniela Carusi
4 Ibid
Women's Health

Invasive Placenta (placenta accreta)

When the placenta grows into or through the wall of the womb.

How the placenta works

The inner lining of uterus is called the endometrium. Most of this is shed during menstruation, but the part in contact with the muscle remains, and from this, the next cycle’s blood-rich tissue is re-grown. Should conception occur, hormonal signals cause this layer to thicken, forming the “decidua basalis”. This, along with a foetal component, forms the placenta, a barrier layer that allows gas exchange, nutrient uptake and waste elimination for the developing foetus, as well as providing protection from the mother’s immune system.

The foetal layer anchors down through the decidua to the wall of the uterus. This is done by small columns of cells (extravillous cytotrophoblast or EVT cells) that link to the myometrium (muscle wall). This anchor needs to be strong enough to last the whole pregnancy, yet must also be able to release as soon as the baby is born, in order to prevent heavy bleeding in the mother.

How invasion may occur

If the decidua is not sufficiently thick, the EVT cells may accidentally burrow through into the wall of the uterus. A normal decidua is also crucial to the placental detachment process, initiating the process by secreting the special “Nitabach’s layer”. If the placenta does not deliver within 30 minutes of birth, placenta accreta is suspected.

There are three categories of invasive placenta, differentiated by the depth of invasion (although all may be present in the same patient):

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accreta (least invasive)</td>
<td>Most common 80% of cases¹ Minor cases of accreta mean the placenta usually detaches following delivery and any remaining tissue can be removed by an obstetrician with an epidural top-up.</td>
</tr>
<tr>
<td>Increta</td>
<td>15% of cases² These cases are slightly more invasive, but still remaining within the uterus itself.</td>
</tr>
<tr>
<td>Percreta (most invasive)</td>
<td>Rare 5% of cases³ These cases penetrate the entire myometrium (uterine wall), and may attach to other organs, such as the bladder or rectum.</td>
</tr>
</tbody>
</table>

¹ Aggregate – estimates range from 75-84%
² Aggregate – estimates range from 13-17%
³ Aggregate – estimates range from 3-7%

Risk factors

The risk factors are events that may have damaged the endometrial lining before the pregnancy began, for example:

1. Previous Caesarean sections – impossible to diagnose beforehand
2. Previous uterine surgery (myomectomy or dilation & curettage)
3. Intra-uterine (hysteroscopic) surgery
4. Embolisation for fibroids

Those with two or more risk factors should ask their obstetrician to arrange a placental ultrasound at 19-22 weeks. It is rare to experience this condition without at least one risk factor, and with one, the outcome is usually good.
**Uterus-sparing treatment**

Most women would be averse to losing their uterus, especially if further children were desired. Additionally, in cases of extreme invasion (e.g. of the bladder), it can be difficult to remove the uterus and placenta without damaging the adjacent organs.

In some cases, resection around the placenta may be possible. Embolisation may also be a possibility – in 2004, a case was described in Mount Sinai Hospital, Toronto, where the placenta (percreta) was left in place following delivery. Uterine artery embolisation (UAE) was performed down balloon catheters to prevent postpartum haemorrhage and to promote shedding of the placenta. After six months, the uterus had returned to the non-pregnant state. This method has since been used in many cases, although comprehensive data has yet to be gathered – for conditions as (thankfully) rare as this, it can be difficult to perform properly designed randomised studies. However, individual cases have shown good results, and whether it is used as an adjuvant or alternative to surgical treatment, IR is proving “an integral part of the assessment and management of women with suspected invasive placenta.”

**Traditional treatment**

The most straightforward treatment for a woman presenting with invasive placenta is a planned caesarean section followed by hysterectomy, or in severe cases, early termination and hysterectomy. Prior diagnosis is an important factor in the planning and success of these treatments. However, even in the most well-managed cases, life threatening bleeding can still occur.

*...with the help of IR*

IR can assist in these surgical cases, using a method called internal iliac artery embolisation (IIAE) to reduce bleeding. This method involves the placement of catheters within the internal iliac artery, and either singularly or in combination, using this catheter to deploy balloons to block off blood flow, or delivering embolic particles to form a barrier against the bleeding. This method improves outcomes and potentially reduces blood loss and transfusion requirements, though not necessarily the need for hysterectomy.

IR can also be helpful in locating the source of problematic bleeding – given the extensive network of collateral circulation in the pelvis during pregnancy, this can be difficult to locate without advanced imaging, such as that performed during IIAE.

**Reducing the risks**

Invasive placenta is a dangerous condition, and in many advanced cases, hysterectomy is unavoidable. However, even in such cases, IR has an important role to play in managing bleeding and reducing the dangers of such major surgery. Sparing the life of the mother should always be the number one concern.

But in some cases, sparing the uterus is also possible, and IR can assist with this too, either through bleeding control or, more incredibly, in allowing the uterus and placenta to be left in place to devolute naturally. These advances mean that safer treatment options can be offered to those women facing potentially fatal pregnancy complications, reducing the maternal mortality rate even further.

**IR has an important role to play in managing bleeding and reducing the dangers of (unavoidable) major surgery**

4 www.mountsinai.on.ca/care/placenta-clinic/complications/invasiveplacenta
Malignant neoplasm (cancerous lesion)

The continuous growth and spread of the cancer and its interference with the health of other body systems can lead to a range of complications. The development of breast cancer is connected to lifestyle, environment and genetics.

Finding a lump in the breast can cause worry and panic, as a woman and those close to her naturally fear the worst. Treatment of breast tumours, whether malignant or benign, traditionally entails surgical removal, which can be both physically and emotionally scarring. Increasingly, interventional radiology is providing a range of minimally invasive techniques that vitally support the modern treatment of breast tumours.

Malignant or benign?

Imaging techniques are a valuable part of the clinical assessment of breast tumours, although characterisation of a lesion is currently best completed with histological analysis of a tissue sample taken via biopsy. The lesion can then be classified, allowing a definitive diagnosis to be made.

Whereas in former years open surgical biopsies were usually performed, safer and less invasive procedures like fine needle aspiration, core needle biopsy, and vacuum-assisted biopsy are now commonplace (see IQ Issue 1).

Two of the most notable types of breast tumour are:

- **Fibroadenoma**

  Fibroadenomas tend to occur in women of reproductive age. They can at times cause deformity, pain and discomfort, not to mention immense psychological and emotional strain linked to the fear of cancer. Management often involves observation of non-troublesome lesions and surgical excision of problematic growths. An informed patient may choose to have an asymptomatic lesion treated out of personal preference and for peace of mind.

- **Malignant neoplasm (cancerous lesion)**

Advancing techniques for both diagnosis and treatment, coupled with high-profile awareness campaigns have resulted in better outcomes and improved survival rates. Nevertheless, the struggle against breast cancer continues and it remains the single greatest cause of cancer-related mortality in women worldwide.

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1 Cancer Research UK
http://info.cancerresearchuk.org/prod_consump/groups/cr_common/@nre/@sta/documents/generalcontent/crukmig_1000ast-2841.pdf
Breast Tumours

IR interventions

Percutaneous excision
Breast lesions are completely removed with a special biopsy device under image-guidance. After removal through an incision of typically less than 1cm, the lesion is diagnosed histologically. The technique is limited to small tumours: the American Society of Breast Surgeons recommends 4cm as the maximum diameter of fibroadenoma that should be removed with this technique.

Developed from minimally invasive biopsy techniques, percutaneous excision is a less invasive alternative to surgical excision. The devices used in this procedure have a cutting tip (for example utilising RF energy) to forge a path through the tissue to the lesion, and are usually vacuum-assisted to pull in the captured sample and remove gas and liquid build-up.

Radiofrequency ablation (RFA)
This ablation technique uses needle probes that are inserted through the skin and into the tumour, with the help of ultrasound or CT imaging. The probes emit a high-energy radiofrequency current which produces heat within the tumour causing it to die.

This minimally invasive technique is most established for liver tumour ablation but research into its application to breast tumour treatment is ongoing. Due to technical requirements and the need to include a good margin around the ablated zone, only small breast tumours of around 2cm have so far been treated in this way.

High-intensity focused ultrasound (known as HIFU or FUS)
Everyone is familiar with the use of ultrasound in imaging and thanks to recent advances this ubiquitous technology is being developed in the therapeutic direction as a promising non-invasive thermal ablation technique.

Unlike diagnostic ultrasound, HIFU focuses the ultrasound waves precisely upon a target lesion. In a similar fashion to how otherwise harmless light can be focused to a burning point by a magnifying glass, the ultrasound waves do not have any effect passing through the body, but generate lethal heat at the point upon which they are focused. Already established in the treatment of uterine fibroids, trials applying this technique to breast tumours are in progress and beginning to show promise.

HIFU treatments may be guided by magnetic resonance (MRgFUS) or ultrasound (USgHIFU). MR-guidance has the advantage of a better anatomical resolution and may provide quantification of temperature at the level of the ablated zone. US provides real-time images with the benefit of using the same form of energy that is being used for therapy; moreover it is the cheapest imaging modality available.

Laser therapy
The lesion is typically localised using ultrasound or stereotactic imaging and a laser fibre is delivered directly to the tumour through a hollow percutaneous needle. The fibre emits high-energy light which heats the tumour and induces death.

Interstitial laser thermotherapy (ILT), also known as laser-induced thermotherapy (LITT), is under development for the treatment of a number of tumour types including breast cancer. This quick and precise technique is already proving to be a useful option for treatment of fibroadenomas.

The importance of IR
IR is providing a growing range of effective and humane options for breast tumour management. The minimally invasive nature of these interventions makes them ideal for treating the increasing number of small lesions that are diagnosed.

With special thanks to Dr. Franco Orsi for his valuable support
Women’s Health

Need a second opinion? Here, have six.

Breast Tumours

Dr. Franco Orsi
IR, European Institute of Oncology, Milan, Italy

“IR is representative of the latest phase in the conceptual revolution of breast cancer management that has occurred over the last 40 years: shifting from aggressive to more conservative treatments. The evolution of this concept has been supported by IR with techniques such as minimally invasive biopsy, as well as radiofrequency and laser ablation. High-intensity focused ultrasound (HIFU) is under development and has already been demonstrated as safe and feasible for treating small breast cancers; the absence of ionising radiation is its great advantage. Patients universally prefer such treatments over surgery due to the lower discomfort involved. “The improvement in diagnostic detection of smaller tumours has meant that they may be treated with progressively reduced invasiveness. Minimally invasive IR procedures therefore have a growing role to play as an adjunct to classical oncology and surgery, and also as a palliative option for those unable or unwilling to undergo surgery.”

Postpartum Haemorrhage and Invasive Placenta

Prof. Anna Maria Belli
IR, St. George’s Healthcare NHS Trust, London, UK

“That said, many protocols still put IR virtually at the end of the treatment spectrum, just before they do hysterectomy, and that’s too late. If we can pick up cases earlier, IR can save lives, or it can save the women from having to have a hysterectomy, which is quite devastating if you’re in your 20s and you think you’re just embarking on your family life. Regarding invasive placentas, we IRs are seeing many more cases now, because they can be identified beforehand and obstetricians are turning to us much more. We help them by occluding the blood flow with balloons to make their surgery clearer and safer, and then embolising, should they have problems with haemorrhage; or to aid placental involution.”

Pelvic Congestion Syndrome

Dr. Raman Uberoi
IR, John Radcliffe Hospital, Oxford, UK

“The diagnosis and treatment of chronic pelvic pain is a complex issue and pelvic congestion still remains a very under-diagnosed condition. Unfortunately, pelvic congestion is often thought of after many other conditions or causes for pelvic pain have been excluded. “Medical management to increase venous contraction provides symptomatic relief for a short period, but benefits are not sustained. “IR is minimally invasive and can be performed on a day-case basis. Embolisation is found to be technically successful in 98-100% of cases. Improvement of symptoms occurs within the first two weeks, and is seen in 70-85% of patients.”
The Experts’ Voice

Uterine Fibroid Embolisation

Dr. Jean-Pierre Pelage
IR, Ambroise Paré Hospital, Boulogne, France

“There is much scientific evidence now that embolisation is a good alternative to surgery for selected patients. We offer embolisation only after a very careful evaluation of each case: hormonal evaluation, precise MRI evaluation and a comparison with alternative options.

“UFE is even discussed at gynaecological meetings and most gynaecologists in France now consider UFE as an option. Furthermore, many hospitals have multidisciplinary meetings where all the available treatments are discussed for every patient. This collaboration is important as the situation is quite complex, especially with regard to preservation of a patient’s fertility.

“Some hospital administrators still don’t know much about embolisation but they should be aware that the procedure is saving costs in terms of hospital stay, in terms of recovery, and in terms of minimal access.”

Dr. Lindsay Machan
IR, Vancouver General Hospital, Canada

“When we first started performing UFE we wanted to show how cost-effective it is, because these are women in the prime of their working life. We keep them in hospital one night, we get them back out and into the workforce after a week, as opposed to an open operation, with a couple of days in hospital, and usually six weeks on average before they get back to work.

“So we did a study in British Columbia on the cost of fibroid embolisation versus hysterectomy and we showed that although IR does look somewhat expensive up front, in fact it was a huge saving to the publically-funded healthcare system, because these women get back to work sooner.”

Dr. Paul Lohle
IR, St. Elisabeth Hospital, Tilburg, Netherlands

“Gynaecologists have found that starting embolisation procedures with IRs in their own hospital actually increases their practice. In our hospital, more and more patients have come to our clinic from all around the world, because we have become a centre of excellence.

“The other hospitals around us have lost patients, as a centre with minimally invasive options such as ours will attract more patients. Some of these patients will undergo myomectomy, some embolisation. Some will choose hysterectomy because embolisation failed or they are so fed up they want to have a definitive solution to their problems.

“What is most important to the patient is to have all the information, all the options available – that is what will attract them.”

How these fibroids...were treated via this puncture

What minimally invasive really means:
this actual-size representation shows how only a pinhole-sized puncture is needed for UFE

Read this patient’s story on page 27
You’ve come a long way, UFE
5-year data follow-up

The long-term follow-up of high quality, randomised trial data marks the final fortification of a “fortress” of scientific evidence supporting uterine fibroid embolisation (UFE).

For a procedure in the young specialty of IR, UFE has withstood a considerable amount of scientific scrutiny. Tried and tested, UFE has come up smiling to earn its position as a standard-of-care treatment for symptomatic uterine fibroids, offering a uterus-sparing option of unmatched gentleness that every woman has the right to hear about.

Looking at the clinical research on UFE, IQ has the privilege to be able to concentrate on randomised trial data. Of particular interest to this review are trials comparing UFE to surgery with the 5-year follow-up of the EMMY trial leading the way, exhibiting the long-term efficacy of UFE and confirming its position as a standard-of-care procedure.

Gentle on the body

The minimally invasive characteristics of UFE are evident in all research. The short hospital stay (1-2 days) content health administrators while patients delight in the rapid recovery that UFE allows – light activity is possible in a matter of days, the return to a routine lifestyle can be expected within 1 or 2 weeks and a return to work is possible at an average of 20 days (compared to 60 days for hysterectomy).

Although short-term discomfort (known as post-embolisation syndrome – see page 28) is quite common and requires careful management, UFE has also been shown to be less painful than surgery at 24 hours and allows a significantly higher quality of life after 1 month.

Gentle on the mind

A fact that is sometimes overlooked in research is that fibroid embolisation is intended to retain the uterus and its full functionality. From a clinical research perspective this may not factor into efficacy or safety of the procedure but ask any patient and you will be sure to hear how important this is.

Although fertility after embolisation is an issue, the psychological impact of UFE on the patient is far less than that of hysterectomy and comparable to that of myomectomy, which remains a lot more invasive and does not show convincing fertility rates in all instances.

Gentle on the purse

In both the EMMY (Netherlands) and the REST (UK) trials UFE was found to be more cost-effective than the surgical options, more pronouncedly so in the case of hysterectomy which causes high costs due to the long hospitalisation. Considering that IRs are working hard on optimising the procedure (see featured trial, page 36) it can be assumed that the cost advantage will be extended as the need for re-interventions decreases even more.

UFE – the new state of the evidence

The 5-year follow-up of the EMMY trial confirmed the known advantages of UFE over hysterectomy, adding long-term assurance and some new insights.
You’ve come a long way, UFE

The surgical re-intervention rates following UFE that had been found in previous studies were largely confirmed in the long run (24% at 5 years). Unprecedentedly, hysterectomy was also found to require re-intervention in 12% of the cases at 5 years (usually as a consequence of the initial surgery) and showed a significantly worse score on the defecatory distress index that was surveyed at 5 years.

Cumulatively it was shown that at 5 years, 76% of women could retain their uterus with UFE – a procedure that outperforms hysterectomy in terms of invasiveness, psychological impact and cost.

A “Fortress of Evidence”

UFE’s advantages, derived from its minimally invasive nature, are obvious in all data. The addition of 5-year results provides final proof that UFE is a gentle procedure with short hospitalisation which is as effective as surgery but less painful and with far shorter recovery times.

There are some noteworthy concerns, post-embolisation fertility being the most prominent (inferior to reported fertility rates after myomectomy), which require careful consideration. But we can only agree with the primary investigator of the EMMY Trial, Prof. Jim A. Reekers when he claims that a “fortress of evidence” has been constructed for UFE and that it has established itself as a safe and effective alternative to surgery which far more women deserve to hear about.

Considering the economical aspect of the procedure and the inexorable work of IRs improving UFE treatment even further (see featured trial, page 36) we are certain to see UFE move out of its, still somewhat solitary, fortress into the mainstream of uterine fibroid treatments.

A.B.

UFE vs Surgery*

<table>
<thead>
<tr>
<th></th>
<th>UFE</th>
<th>Hysterectomy</th>
<th>Myomectomy</th>
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<td>1-2 days</td>
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<td>Return to work</td>
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<td>No</td>
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<tr>
<td>Fibroid symptoms resolved</td>
<td>80-90%</td>
<td>100%</td>
<td>80-90%</td>
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<td>Quality of life (1 month)</td>
<td>Improved physical and social function</td>
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<td>Equal</td>
</tr>
<tr>
<td>Major complications</td>
<td>Equal</td>
<td>Equal</td>
<td>Equal</td>
</tr>
</tbody>
</table>

* compiled from randomised data: EMMY trial, REST trial, Mara et al. trial, Pinto et al. trial

© UFE: Reflekta, © Hysterectomy: Redwine2001, Dreamstime.com, © Myomectomy: Ari N

EMMY Trial: Reekers JA et al; “Uterine Artery Embolization (UAE) Versus Hysterectomy for Uterine Fibroids, 5-year results” presented at CIJSE 2010


Mara M et al; “Mid-term clinical and first reproductive results of randomised controlled trial comparing uterine fibroid embolization and myomectomy” Cardiovasc Intervent Radiol 2008; 31: 71-85
The Best of Both Worlds
How the patient benefits from specialist cooperation

Many IR-gynaecology teams are reaping the rewards of working together and providing patients with the best of both specialties.

Prof. Anna Maria Belli (AB) and Mr. Isaac Manyonda (IM) spoke to IQ about their own positive experiences of a team approach and the benefits that such collaboration can bring.

Prof. Anna Maria Belli is a Consultant Radiologist and Professor of IR, Mr. Isaac Manyonda is a Senior Consultant Gynaecologist; both work at St. George’s Healthcare NHS Trust, London, UK.

The medical advances of the past few decades have brought many new specialist groups into the hospital. How does this affect the need for collaboration?

IM: Interdisciplinary collaboration is essential. Specialists from different disciplines bring different knowledge, skills and viewpoints. No single training programme can encompass these and so collaboration is essential to allow patients to benefit from our combined expertise and knowledge.

How are patients referred between departments within your hospital?

AB: We have a very good relationship based on mutual respect. We each receive referrals from outside and refer cases to each other. We are confident in the knowledge that no matter to whom the patient is referred, we will include the other specialty in the dialogue. My gynaecology colleagues are happy for me to see the patient first if the patient specifically wishes to discuss uterine artery embolisation (UAE) and so I receive direct GP referrals in some cases, arrange the imaging investigations and refer to my gynaecology colleagues to discuss other options.

How is the most appropriate treatment decided upon?

AB: Often patients come with specific ideas of which treatment they would like, and if they are suitable for both embolisation and surgery, they will make the final decision for themselves based on what we have told them. If I do not think they are suitable for UAE, or that surgery is a better alternative for them, I refer them to gynaecology.

Has there always been a team approach between your respective departments at your hospital, or is it a recent development?

IM: We have been working together for nearly 15 years. The team approach has grown over that period. Gynaecology and IR were not natural collaborators until fibroid embolisation developed. Before that, we encountered each other infrequently when a patient haemorrhaged following surgery or for gynaecological malignancy. Our team spirit grew as we realised how beneficial we both were to patient management and how much new research was generated by our collaboration.

Who is responsible for good collaboration – the individual or the institution?

IM: Good collaboration is down to the individuals involved. We have realised that by working together, we receive more acknowledgement and referrals than we ever did when we practised individually. This team approach was acknowledged recently, when we both made the top-ten list of fibroid surgeons in the UK, according to a poll in a national newspaper. A good department or team is never just down to one person.

What role does hospital management have in supporting this way of working?

AB: Hospital management should support such collaborations by ensuring that they have enough support staff, beds and technology support. Ultimately good collaborative teams benefit the hospital by increasing the case load and generating income. We still encounter challenges every day related to time pressures and resourcing. Overall however, there is general recognition and support for what is an effective collaborative approach.

Why do you think IR is finding it difficult to gain clinical recognition from other specialists? What needs to be done to alter this?

AB: I think the main issue is that training in diagnostic radiology does not encourage clinical control and it is very difficult to introduce the concept of clinical time into our job plans as this does not help with waiting times that need to be reported. In obstetrics and gynaecology, I have had no difficulty in gaining recognition as a fellow clinician. Gynaecology has encouraged me to be clinical...
by suggesting I have beds, run clinics, and receive direct referrals.

IM: There isn’t a turf battle. IR is not taking patients away or reducing gynaecology surgical skills. The opposite has occurred as our expertise in managing these patients collaboratively is realised and we receive more referrals.

How does the interventional radiologist complement the work of the gynaecologist?

IM: We see things differently by coming to the same problem from a different angle. By working together, we learn from each other. Because of this, interventional radiology’s role in gynaecology and obstetrics is expanding into the management of obstetric haemorrhage, the treatment of ectopic pregnancies, the management of gynaecological cancer, etc. Once gynaecologists become used to working with IR and appreciate what it has to offer, the indications will continue to expand.

Is there any advice you would give to other IR-gynaecologist teams who need to work together?

IM: IRs should identify a key person in the gynaecology team who will work with them and refer cases. Then go out to referring clinicians and present yourselves as a team who by working together can offer patients the wider scope of a variety of treatments. We have found that although we developed our clinical expertise individually, since strengthening our team approach our workload has expanded exponentially.

What have been the long-term benefits of working together for you as clinicians?

IM: The long-term benefits have been the broadening of our horizons, the establishment of excellent training for our juniors who grow to appreciate the advantages of collaborating with other disciplines, and the generation of research to help our understanding and improve our treatments.

AB: Our success has engendered enthusiasm amongst other gynaecologists who were initially reluctant to embrace the new technology. While collaboration between IR and obstetricians and gynaecologists is predominantly in the management of fibroid disease in terms of volume of work, we are receiving an increasing number of referrals for the management of women with abnormal placentalation, pre-operative planning and appropriate intervention significantly reducing the risk of caesarean hysterectomy. For general post-surgical haemorrhage, women who would otherwise be returned to theatre are managed successfully with embolisation.

Can you tell us about a real-life case where a particular patient has benefited from IR-gynaecologist collaboration?

AB: Our collaboration started 15 years ago when I offered pre-myomectomy embolisation for women at high risk of haemorrhage during myomectomy. One of these women was referred from the fertility clinic and was desperate to become pregnant, even though she had multiple large fibroids, had undergone previous myomectomy and was considered at high risk of haemorrhage.

She was counselled about this risk and the need for pre-surgical embolisation with its then unknown effect on her fertility. She was advised to avoid becoming pregnant for six months following the procedure but despite this became pregnant two months later and happily delivered a healthy baby. She was delighted.

We published on the benefits of pre-myomectomy embolisation in certain women such as Jehovah’s Witnesses, those with massive fibroids or previous myomectomy with large fibroids. Clearly many more patients are benefiting as a direct result of our collaborative efforts.

A.M.
Prof. Ricardo Garcia-Monaco,
Hospital Italiano, University of Buenos Aires, Buenos Aires/Argentina

Nowadays in my hospital if a patient asks their gynaecologist, ‘is there any alternative to hysterectomy?’ The response is usually, ‘yes – interventional radiology.’ I performed my first cases in 2000 via self-referral, and when I had treated around 50 patients, I approached our gynaecologists with the results. They were so impressed that they started supporting IR. To show I intended on working with, rather than against gynaecologists, I assured them that I would not treat a patient until they had seen her, and that all my patients would be hospitalised in the gynaecology ward. We also have joint rounds with our vascular surgeons and other colleagues, which help us all communicate better.

We ensure referrals by providing excellent service and being responsive to incoming requests. Gaining the confidence of colleagues initially meant being available to do emergency procedures, and going the extra mile to help with such cases as postpartum haemorrhages. So they understood that we weren’t interested in stealing from their practice, but in adding to it. We have excellent collaboration with our colleagues in other departments. Optimally we will create a formal collaboration, if not already done, to ensure a lasting good working relationship.

The treatment of symptomatic fibroids in Argentina is covered by social security. However, both awareness and supply still need to be improved – there are very few groups in Argentina that are experienced in performing embolisation. So the main goals of our educational activities are to ensure eligible patients are referred to a reputable clinic, as well as broadening the network of practitioners to cater for those outside the biggest cities.

To spread awareness, I also spoke to a woman’s physician group. Among women in the age group who seek treatment for infertility or fibroid embolisation, the most trusted source is still their family physician, who is overwhelmingly a female primary care physician. And so speaking to the woman’s physician group was probably the most cost-effective thing that I did to spread the word and raise interest.

Dr. Lindsay Machan, University of British Columbia Hospital Vancouver/Canada

Worldview

To collaborate, or not to collaborate – that was never the question...

Leading interventional radiologists told IQ how and why they joined forces with their colleagues from other disciplines, and the advantages this approach has on the patients.

Refer to page 16 for more insights from the experts.

Prof. Ricardo Garcia-Monaco, Hospital Italiano, University of Buenos Aires, Buenos Aires/Argentina

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Dr. Lindsay Machan, University of British Columbia Hospital Vancouver/Canada

Dr. Paul Lohle, St. Elisabeth Hospital, Tilburg/Netherlands

There is a very close collaboration between radiologists and gynaecologists in our hospital, which is the reason we are so well known.

Our hospital administration is very supportive. Nursing care is provided in collaboration with the gynaecology ward and it works well. I check patients on the gynaecology ward before and after the embolisation procedure, and they come to our department to do a check-up MRI. We are by far the largest of around 10 hospitals that offer fibroid embolisation in Holland – we do more than 200 cases a year, with the next largest hospital doing 20 to 30. So that’s not enough, I still think there are a lot of hysterectomies performed unnecessarily.

Currently a Dutch think-tank of radiologists and gynaecologists meets on a regular basis to draw up guidelines that will offer all women with bleeding problems the best type of treatment – in which interventional radiology undoubtedly plays a significant role.
I only treat patients who have also consulted with my colleagues in gynaecology. We enjoy very good cooperation with the Obstetrics and Gynaecology department. We always help them with emergency cases of postpartum haemorrhage or uterine bleeding, day or night, and so they welcome us as allies. They know we are both available and able to help, as we succeed in helping the patient in 90% of cases, and our gynaecologists are keen to preserve the uterus wherever possible.

I believe it’s better to share the patients. They should always come first, and for uterus problems, the gynaecologist is the main doctor, who can then decide on the best treatment, which may ultimately be provided by us. We’re lucky to have a system that allows this cooperation. I don’t have to think in terms of ‘my’ patient – they are our patients that need our help.

Dr. Keigo Osuga, Osaka University Graduate School of Medicine, Osaka/Japan

Dr. Adel Ahmed, Kuwait University Faculty of Medicine, Nuzha/Kuwait

Our hospital administration recognises that we can reduce costs by performing many procedures on an outpatient basis, and is supportive of our work. IR in the field of gynaecology is well established in Kuwait. We have been performing uterine fibroid embolisation since 1997 with a high success rate, and have circumvented surgery in more than 800 Obstetrics and Gynaecology patients in the last 10 years. We have 9 dedicated interventional radiology nurses and radiology technologists, as well as a dedicated anaesthetist to assist with all patients. Regular interdepartmental meetings help us communicate well with our surgical and medical colleagues. Most gynaecologists are aware of this service. However, many of our patients are not aware of the exact meaning and role of the interventional radiologist. We need to educate the public in Kuwait and the Middle East generally regarding the vital role of IR in modern medical practice.

Dr. Donald Robertson, Geelong Hospital, Geelong/Australia

Gynaecologists who are positively disposed to UFE see it as an adjunct to their suite of offerings for symptomatic fibroids, and they don’t see it as competitive. Women are becoming much more aware of their own bodies and their right to ask for what they want. I supported this by raising awareness of the minimally invasive options available to women in the local press. Frequently these women will then take that information to their GP and request a referral to a gynaecologist, and then take that same information to their gynaecologist and ask for a referral to an IR. So it’s driven by the patients. A gentle option such as uterine artery embolisation may encourage women to seek medical advice, even if it results in another procedure. After a 6- and 12-month follow-up, I usually don’t see the patient anymore, and they go back to their gynaecologist, who will send me updates. So I think there’s a real role for that collaborative side.
Travelling the Information Superhighway to Reach IR

- Where do you turn first when you have a health problem?
- What if you still want to know more or hear a second, third, or even fourth opinion?
- How do you find out about the latest and most effective treatments available?

The answer to these questions is often, perhaps surprisingly, not a doctor. Many in fact depend on an information resource that is easily and quickly accessible, low in cost, and more extensive than any encyclopaedia: the internet.

Internet
Despite the challenges of navigating this vast resource and separating the good quality information from the bad, many people turn to the internet in search of advice. Armed with the information they find they are then empowered to seek out the latest treatments that might be of benefit.

Increasing demand
As modern patients show ever more desire to take control of their own health, they rightly expect more support in making informed decisions. If hospitals are to meet the growing patient demand for choice it is imperative that they not only provide comprehensive patient information but also continually invest in providing the full range of effective treatment options. In this way, customer satisfaction can be enhanced and a steady stream of new patients ensured.

Raising awareness
Internet communication has already been a driving force behind growing awareness of uterine fibroid embolisation (UFE) and an associated rise in demand. It is with the help of the internet that people whose lives are affected by uterine fibroids can take the time to learn about their condition and the various possible treatments, as well as hear the experiences and points of view of others who have already been through it all.

No to hysterectomy
Many women with uterine fibroids, after being told hysterectomy is their only choice, desperately look for a less drastic alternative in the hope of finding a treatment that will not only leave their body intact, but will also be more convenient and have a shorter recovery time.

Victoria Norton, a former UFE patient, describes how her own search for fibroid information online led her to begin providing support for other fibroid sufferers and how online patient forums have special value:

“When I started looking for alternatives to hysterectomy to treat my symptomatic fibroids in around 1999 I turned to the internet. I found a lot of excellent information in English and a wonderfully supportive patient forum started by an American patient advocate called Carla Dionne. It inspired me to start a German-language forum for women in Germany, Austria and Switzerland.

“Doctors today are under pressure so a typical consultation might last around ten minutes. This time can be used more effectively if women have an idea of the range of options and can ask specific questions. Some of the more old-fashioned doctors can feel very threatened by this development but the more modern ones really seem to appreciate it if women take responsibility for their own health.

“Also, forums offer a way of women getting much needed psycho-social support from others in the same

Example visitor statistics from patient information websites for UFE

<table>
<thead>
<tr>
<th>Website</th>
<th>Language</th>
<th>Average visitors/month*</th>
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<td><a href="http://www.ask4ufe.com">www.ask4ufe.com</a></td>
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<td>33,000</td>
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<td><a href="http://www.uterinefibroids.eu">www.uterinefibroids.eu</a></td>
<td>English</td>
<td>482</td>
</tr>
</tbody>
</table>

* The visitor statistics from a selection of UFE information websites give an indication as to how many women are informing themselves in this way.
Online Info for Patients

CIRSE, as the European society for IR, has produced patient information brochures written by experts in the field. They are available in a range of languages on the following topics: Interventional Radiology, Peripheral Vascular Disease, UFE, and Interventional Oncology. For more information please visit: www.cirse.org/index.php?pid=612

3 of fibroid sufferers not told about UFE

One study of patients at a uterine fibroid clinic showed that two thirds of the women surveyed were not previously told about UFE by their gynaecologist, and that the internet was one of the most common ways of learning about the procedure.1

UFE an option

In subsequent consultation, IRs who offer UFE will make an individual assessment of a patient and, after due consideration, alternatives may even be recommended if UFE is not suitable. Likewise, gynaecologists can meet patient expectations by also considering and mentioning UFE as an option.

Less trauma

Acting as an informative guide through the maze of options, IRs and gynaecologists alike can build trust and enhance their professional image by working with patients to choose the optimal treatment, while minimising unnecessary physical and psychological trauma.

IR an asset

The emotional impact of the prospect of hysterectomy should not be underestimated and hospitals can use the internet to promote their IR department as the cutting-edge asset it is, making the most of the growing interest in UFE and other minimally invasive procedures.

Whether women who express a preference for UFE do finally undergo the procedure or instead receive another appropriate treatment, the most important factor is that the patient is a well-informed partner in the decision-making process, with a right to consider all the available mainstream treatment options.

Dr. Kroencke, well known for his efforts in patient education, gives an insight into this vital matter: "The reason that so many women turn to the internet is very simple. Women are rarely properly informed about UFE by their gynaecologists. Shockingly, hysterectomy is still the norm for this benign disease. "Hysterectomy is a very invasive option with a long recovery period, as borne out by some of the randomised trials which have taken place."

"Women between 35 and 50 today often have careers as well as young families to take care of. Many regularly take part in sports activities to keep fit. Women don’t want to be out of action for weeks, or unable to do strenuous things like running or cycling."

"An internet forum can help put them in touch with an experienced and qualified IR, so they can find out if UFE is a feasible option."

Victoria Norton explains why women seek advice on uterine fibroids through the internet: "Women between 35 and 50 today often have careers as well as young families to take care of. Many regularly take part in sports activities to keep fit. Women don’t want to be out of action for weeks, or unable to do strenuous things like running or cycling."

"An internet forum can help put them in touch with an experienced and qualified IR, so they can find out if UFE is a feasible option."

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1 Lipman JC, et al; “Community awareness of UAE as a treatment option for women suffering with symptomatic fibroids” J Vasc Interv Radol 2008; 19(2) Supplement S: Abstract 143
An example of a web information service on uterine fibroids is the one run by the Department of Radiology Charité University Hospital, Berlin. Their website, www.myomembolisation.de, provides links to accurate information sources, as well as an information hotline that patients can call to discuss the subject in detail. Dr. Thomas Kroencke is the key driver of this initiative, and has long been spreading the word of the services his department can offer to women with symptomatic fibroids.

Many women are not informed about UFE

“While UFE has been one of the key success stories of IR, I think there’s still room for improvement. It seems that most women are still not even offered the possibility of UFE, and that’s a big problem, both for the patient, and for the medical concept of informed consent.

“We now have a very sound cache of scientific data supporting the efficacy of UFE as an alternative to myomectomy or hysterectomy, but even still, our patients report that they find out about the procedure through websites, through word of mouth but not through their gynaecologists, and that’s the problem. So, many women who are candidates for UFE are not even informed about the procedure.”

Patients are asking for hospitals which perform the procedure

“We were looking through the internet and found this specific website which was not under the name of the hospital; it was simply the procedure ‘.de’.

“Thanks to this website, a lot of patients are asking for further information and for hospitals in their area which might perform the procedure.”

24-hour access to information

“The website is important [compared to other media] because it means 24-hour access to information. It means you don’t have to read a specific magazine in a specific month of a year. It’s always available and the internet is playing an increasing role as a main information source for patients.

“How easily you can be reached by these patients just depends on how good you make your website and how well you put information on there.”

Dr. Kroencke and his colleagues are working to ensure that gynaecologists learn of what IR can offer, as they are the first port of call for patients desperate for advice.

In the meantime, ensuring the patient can find the information themselves is a good way to bridge the knowledge gap. Sites like these are a key tool for informing patients, and Dr. Kroencke is frank about why this kind of action is necessary:

“We can’t wait for our gynaecology colleagues to get on board and hope that presented with the evidence, they will start to refer patients to us. We have to really try to take clinical responsibility for these patients ourselves, we have to provide longitudinal care which begins with patient information, and goes on to treatment and aftercare. This is necessary to reach both your colleagues, who will then realise that these patients can be sent directly to you, and to reach the public, who have a right to know what their options are.

“When I first started to advertise UFE, there were a lot of colleagues saying, ‘Advertising your services is not a very serious way to promote medicine.’ But I think the results of the last few years have proven that this approach is necessary – most of our patients still find their way to our department without the guidance of other medical colleagues, so empowering the patient with information is clearly an effective approach.”

A.M.
Patient Story

Finding UFE
How IR is giving many women a new lease of life

Good quality online information is reaching many women with uterine fibroids, informing them of UFE and leading them to benefit from the procedure. One such fibroid sufferer who found out about UFE in this way was Verena Helm, who instead of undergoing surgery, as her gynaecologist had advised, searched the internet for an alternative.

Ms. Helm went on to become a patient of Dr. Kroencke at Charité Hospital, Berlin, Germany, where she underwent an effective UFE treatment.

Quality of life

She is open about the negative effect uterine fibroids had on her life:

“Due to my condition, including strong bleeding, I was very restricted in all the activities that count towards quality of life. I couldn’t visit a cafe, go for a walk outside, or ride my bike.”

This kind of impact on everyday life is unfortunately all too common with uterine fibroids as sudden heavy bleeding, strong pains and swelling all take their toll on the physical and psychological health of so many women.

In the case of Ms. Helm the before and after images were clear, with the initial imaging study showing two relatively large fibroids in the uterus, each of around 5cm in size. Four months later the fibroids were much smaller and menstrual bleeding as well as the pressure that the affected area had been exerting on the whole uterus was relieved, all thanks to UFE.

The clinical data of the case, pointing towards success, are backed up by patient satisfaction with the procedure, as Ms. Helm confirms:

“After embolisation my condition has become so much better and all kinds of activities are possible again. The effect has been enormous.”

Patient care vital

Dr. Kroencke informs and guides his patients both before and after the procedure. As patients are conscious during UFE, he also talks them through the procedure as it happens. He places much importance on being involved in the whole process of informing the patient of different alternatives, doing the procedure and taking care of pain management in the hospital, as well as dealing with aftercare and any problems that might arise.

This open and supportive communication with the patient is only to be expected from someone who believes that “this is something we need to be aware of as interventional radiologists – clinical practice.”

In order for more patients to benefit from unique and effective methods like UFE, Dr. Kroencke has made efforts to really get in contact with patients, as well as being visible; so that it’s recognised that he, as an IR, is providing the treatment.

He is also available if a patient calls for advice after a procedure and takes responsibility for this in cooperation with the referring department. He considers it poor practice to simply refer a telephone call from a patient to another department or let someone else do the job.

“Nowadays you need to show results, demonstrate how efficient your techniques are and prove that you can care for the patient. You have to get out of your comfort zone and really reach the public and your colleagues.”

Raising the profile of UFE

This pro-active approach is necessary as many patients and even hospitals are still unaware of the range of minimally invasive therapies IR has to offer. Dr. Kroencke asserts that “at the moment, 95% of women that undergo hysterectomy for fibroids could also be treated with UFE.” The situation is changing, however, and thanks to the hard work of many IRs and supportive colleagues from other disciplines many more women now have access to UFE as an effective treatment for uterine fibroids.

As for Ms. Helm, she is positive that she made the right choice when she opted for UFE and since having the procedure has not looked back: “I have a new lease of life!” she says smiling, her happiness clear for all to see.

Information and quotes reproduced with kind permission from BVMed Film Service, www.bvmed.de

Verena Helm: satisfied UFE patient

Dr. Kroencke takes the time to explain the procedure to the patient

A.M.
Report

Post-Embolisation Syndrome

The Achilles’ Heel of IR?

Embolisation offers amazing possibilities to patients and practitioners. In many fields, from cancer to trauma bleeding to treatment of fibroids, embolisation has improved the health and lives of countless grateful people. It helps shorten hospital stays, recovery periods and time off work – so what then, could there possibly be to object to?

Post-embolisation syndrome (PES) is one of the few adverse reactions of embolisation, but with so much conflicting opinion on it, it is hard to know how much of a consideration it is when deciding which therapy to follow. IQ spoke to renowned expert, Dr. Ricardo Garcia-Monaco, on what post-embolisation syndrome is, and how it can be best managed.

“Post-embolisation syndrome is a side-effect of an embolisation procedure. Not every patient will have PES. It is estimated to occur in 30-100% of patients – and the large discrepancy is down to how you define it. I would estimate that a third experience adverse symptoms. Most patients will experience mild symptoms, such as a small rise in temperature, and once a mild antipyretic is given, the patient feels fine. So in that case, the symptoms are not a problem. But some patients do have a lot of pain, vomiting, fever and loss of appetite. The typical symptoms are mild flu-like symptoms.”

Why PES occurs

“That this should happen is perfectly normal. Embolisation causes tissue ischaemia, which produces inflammation, which causes the body to produce defence proteins (cytokines). Cytokines are what cause the fever and pain. It is a natural response. But although it is not dangerous, we like to make the patient as comfortable as possible, so depending on the symptoms we give anti-inflammatory drugs or antipyretics. It is just symptomatic treatment.”

Only one night in hospital

“These symptoms usually appear after 24 or 48 hours, when the patient is back home. And it will last for several days, usually three or four days, but possibly up to two weeks. When we started doing chemoembolisation 20 years ago, we kept patients in for three to five nights, as we didn’t know what outcomes to expect. Now, if the patient is doing well, which almost all are, we send them home after one night. We warn them what symptoms to expect, and give them medication to take. We check up on them via telephone, and if there is anything unusual, we get them to come back in, but only 2-3% will ever be readmitted. Our complication rate is very low. What is important is to inform the patient and their GP of this possibility, otherwise their doctor could wrongly diagnose infection and prescribe unnecessary antibiotics.”

How to differentiate between PES and infection:

- **PES**
  - PES begins hours after embolisation
  - Peaking at 24-48 hrs
  - Lasts several days
  - Main concerns for patient
    - Asthenia; Fever

- **Infection**
  - Fever starts 7-15 days after embolisation
  - Fever persists >39°C
  - Chills, malaise, etc.
  - Clinical deterioration
  - Blood culture +
  - Imaging +

Bigger is better?

“PES is not very well studied, and there is contradictory data, but from my own personal experience, the more aggressive you are in embolising the target, the greater the possibility of an inflammatory pain response. Although not proven, there also seems to be a greater probability of PES if healthy tissue is embolised. So theoretically, top-end imaging equipment could, through reducing non-target embolisation, also reduce PES.”

The overwhelming benefits

“Although some doctors argue that this side-effect is a major reason for patients to avoid embolic treatments, it must be remembered that this pain is still much less than post-operative pain. More importantly, it can be very easily controlled, and is not dangerous. Patients still benefit from shorter recovery periods and fewer adverse effects. With good management, the majority of patients will not suffer any major adverse effects from embolisation.”

C.M.
When something seems complicated, the best solution is often deceptively simple. So when two Brazilian IRs were wondering how to bring IR to low-income women, a marvellously straightforward answer presented itself: in a truck.

Dr. Nestor Kisilevsky and his colleague, Dr. Henrique Elkis, began their itinerant uterine fibroid embolisation (UFE) programme to see if it were feasible to treat uninsured women in a cost-effective way, but soon realised that not only was it safe and effective, it had some surprising benefits too...

Dr. Kisilevsky: “In Brazil we have a two-tiered health-care system: a government-run public health board, on which almost 65% of the population depends, and private hospitals which are mostly maintained by insurance companies. The public system has limited resources, and is unable to offer state-of-the-art technologies, such as IR, widely.

“Uterine fibroid embolisation (UFE) is a good example – since it requires skilled interventional radiologists and appropriate technology and resources, there are very few UFE programmes available in the public system, and hysterectomy is the most common procedure for symptomatic fibroids in low-income women. It has been estimated that every year 200,000 women lose their uterus in Brazil.

“We wanted to change this by providing care to underserved areas. A mobile C-arm could be moved to different public hospitals located in our metropolitan area and provide UFE treatment for women with symptomatic fibroids. We decided to investigate the feasibility of such an itinerant UFE service by a clinical study.”

The Project:
· 2 IRs, 1 nurse, 1 driver, 1 assistant
· 4 hospitals in São Paulo Metropolitan Area
· October 2008-March 2009
· 100 patients with symptomatic fibroids
· 98% satisfaction rate

The Funding:
· Mobile C-arm: Philips Medical Systems
· Contrast agent: Bayer-Schering Pharma
· ½ embolic materials: BioSphere Medical (now Merit)
· IRs: charged no fee
· ½ funding (nurse, driver, van, materials, admin) from Instituto de Responsabilidade Social Albert Einstein
· Additional on-site clinical support from public partner hospital staff (gynaecologists, anaesthesiologists, nurses)

Clinical Outcomes:
· Technical success: 100%
· Mean procedure time: 40.5 mins (12-95)
· Complications: none
· Mean time in hospital: 1.03 days
· Mean time for resuming activities: 10 days
· Mean working days lost: 5.7
· Improvement rate at 3 months: 88%

Was it difficult to implement? Where did financial support come from?
It was certainly challenging and time-consuming. We presented our project and business plan to various healthcare organisations for almost two years before it was realised. Our proposal was always very well received and praised, but no organisation agreed to finance it until we presented the project to the Instituto de Responsabilidade Social Albert Einstein, the philanthropic arm of Hospital Israelita Albert Einstein in São Paulo City.

They decided to support the project, but they reduced the financial support to a third of what we had estimated. This forced us to seek additional partners, but fortunately, the project had great marketing potential and several companies agreed to participate. As my associate, Dr. Elkis, and I charged no fee for our participation, the project was now financially viable.
What hospitals did you work with? What additional preparation was necessary?

While we were waiting for clinical approval from the Ethics Committee of Hospital Israelita Albert Einstein, we planned which hospitals in the São Paulo metropolitan area we should collaborate with. Logistics limited our playing field to a maximum of 100 kilometres around downtown São Paulo. We visited more than ten hospitals, and talked to gynaecologists and administrators at each one.

We finally chose four, based on the interest we noticed from each gynaecological team at those hospitals. Additional time was spent discussing the clinical protocol with the medical staff, including patient selection and work-up.

Once the study was approved by the Ethics Committee, we defined a visual identity with the hospital’s marketing team. An ANGIOMÔVEL logo was created, as well as a slogan for the campaign: ‘medical technology with social responsibility’. The truck was rented and branded; a nurse was hired and trained.

Finally, in October 2008, after almost a year’s preparation, the ANGIOMÔVEL team performed their first UFE procedures. It was a very happy day!

This partnership had the additional benefit of introducing 27 gynaecologists to UFE, and allowing five IRs to be trained in performing it.

What difference does UFE make to the women you treat? What feedback have you received?

Clinical outcomes of our study were essentially the same as have been obtained everywhere: quality-of-life assessment showed a tremendous improvement, and the procedure got a high level of satisfaction. 98% said they would recommend the treatment to another woman with fibroids.

It is interesting that even women with disadvantaged financial conditions are aware about what modern medicine has to offer, and access most of this information through the internet. The majority of patients we treated said they were initially surprised but very grateful and truly happy for having had access to this technology without spending a dime.

Can you see this treatment model becoming more widely used?

I strongly believe this model is very useful, not only for UFE programmes but for other IR procedures as well. The project demonstrated notable economic advantages. Firstly, it allows patients to be assisted in their original places without the need to travel to major centres; secondly, the concept of sharing technology prevents idleness and waste; and finally, performing procedures on a large scale reduces costs.

How did this scheme raise awareness of IR?

This was a very important aspect of the programme. Although the truck was officially used just once a week, it remained circulating every day, acting as a billboard, calling attention to interventional radiology.
Another satisfied customer!

Maria Edileuza Souza is a 45-year-old hairdresser from Santo Amaro, São Paulo who was treated by the ANGIOMÓVEL team. She later appeared on a popular local talk show, “Mulheres em Foco”, along with Dr. Kisilevsky to talk about her experience (pictured). Media exposure such as this helped the ANGIOMÓVEL team spread awareness of minimally invasive treatment options.

“For a year of my life, I could hardly leave my house because of the bleeding. No amount of sanitary pads was enough. Sometimes I would be sitting on the toilet for 40 minutes, bleeding as if I were urinating.

“When I finally begged for help at a public hospital, it was discovered that the bleeding had led to severe anaemia, and the doctors advised a hysterectomy. Luckily, a friend told me about embolisation, and an internet search led me to the Webmioma page.

“I emailed my story to them, and a nurse from Hospital Albert Einstein called to say I might be a suitable candidate for their study. Shortly after, I had my treatment done at Hospital de Cotia. I spent just one day in the hospital and it took only a week to recover and return to work. The last magnetic resonance study showed the fibroid has disappeared completely.

“Before my treatment I had no life, I could not do anything or leave home. I had to endure the embarrassment of being in line at the bank and suddenly being surrounded by mess, because of the flow of blood that I had. The problem was ruining my day-to-day life, and the bleeding was so strong that I feared I might die. But the procedure has changed my life. It was a blessing from God. Now I have a social life, I can go out and work normally. I strongly recommend embolisation for women who have this problem.”

C.M.
Not all in Vein
Real access to a real solution

Being in continual pain is more than just physically unpleasant; it can be emotionally draining as well. But what can make it even more draining is when nobody believes you – and when no solution or treatment is in sight.

This is the reality for many women suffering from pelvic congestion syndrome. As the varicose veins that cause their pain are hard to diagnose, many are told it’s all in their heads, making the burden of pain even heavier than it needs to be.

IQ spoke to Mary Ellis*, a 42-year-old ex-teacher with two daughters, about her experience with pelvic varicosities, and how IR has brought her both reassurance and relief.

What symptoms did you have?
I had a nagging pain deep inside me. It was especially bad when I was lying or sitting down. Intercourse was painful, both deep inside and because I had large, visible labial [external] varicose veins, although at the time I didn’t realise the two were connected. I became really fed up and lost my job because of the dragging pain in my pelvis.

What treatment options were available for you?
I wasn’t offered any treatment at all. My GP sent me to see a gynaecologist, and a very disinterested young lady did an ultrasound and a very painful transvaginal ultrasound, which I wasn’t very happy about. The gynaecologist also did several other kinds of investigations, and told me they couldn’t find anything wrong. Later I went to see a surgeon about the labial varicose veins and he sent me for an MRI scan, which is what eventually showed the internal problem.

Why did you decide to undergo IR?
I didn’t know anything about it before the MRI scan. The vascular surgeon told me that the doctor who had diagnosed the problem was an interventional radiologist who could also fix the veins. So I went to see Dr. Nicholson, the IR in question.

Can you describe your experience of the procedure itself?
Having to have any procedure done is a little frightening, but I knew straight away by Dr. Nicholson’s manner that I was in very capable hands. The skill and competence of him and his team were very much appreciated. I did get a bit of pain and felt slightly woozy for a while, but whatever they gave me took the pain away and I was able to go home after Dr. Nicholson saw me on the ward at lunchtime. I had a bit of an ache in my left side for most of the following day, but have been fine since.

"The skill and competence of (Dr. Nicholson) and his team were very much appreciated …and I was able to go home after (he) saw me on the ward at lunchtime"

Is there any aspect of referral or diagnosis that could be improved, in your opinion?
I think my GP should have known something about this. It was a very unpleasant experience seeing the gynaecologist, as everyone seemed very disinterested. However, the young vascular surgeon was very good and his referral to Dr. Nicholson really changed everything. Dr. Nicholson’s team were wonderful, especially Jodi, one of the nurses, who looked after me very well.

What were the results – are you glad you had the procedure done?
The veins in my legs and elsewhere have already reduced considerably and so far I haven’t had any more pelvic pain – though it is only 6 weeks since the procedure. I have my fingers crossed that it will remain as good as this, though Dr. Nicholson said I might still need some more treatment if the symptoms don’t go away completely. So far, so good!

* Name has been altered to respect the patient’s privacy
How was the patient referred to you?
We get referrals for ovarian vein embolisation from GPs, gynaecologists and vascular surgeons from all over Yorkshire. This particular case was unusual though – the patients referred to us from vascular surgeons usually have labial and thigh varicosities as their primary symptoms.
This patient also had severe pelvic pain and a very clear history of PCS, but somehow the gynaecologist she visited did not recognise the symptoms. In fact, she had been told that there was nothing that could be done, which simply wasn't true! Some gynaecologists and GPs are very good at recognising the signs and symptoms, but unfortunately not enough are.

Are there any alternatives to IR?
Many patients get treated with painkillers and antidepressants. I cannot recall a single patient who has been offered surgery for the condition, though there is a surgical alternative – not a very good one. Though psychotherapy is said to work, I have not come across any patient who has been offered it. Although the neuropeptides released from the ovarian veins due to this condition may contribute towards a feeling of depression, I don't understand how psychotherapy could relieve the symptoms of a physical disease.

How are patients with pelvic varicosities treated?
Patients are seen on our day ward. We are careful not to elevate expectations too high: we tell them that 50% will get better after one treatment, but that 50% will require follow-up treatment, and around 10-20% will not get symptomatic relief whatever we do.
We ask about past medical history and explain non-target embolisation; we also explain about femoral vein and jugular vein punctures – I let the patient decide the puncture. We do not routinely sedate patients, which enables them to go home very shortly after the procedure. The patient may get some immediate back pain which may last for 48 hours, but paracetamol will relieve this. If the patient experiences back pain immediately on injection of the sclerotic material despite the paracetamol, we treat this intravenously with fentanyl, which always stops the pain.

What benefits does IR bring the patient?
In my experience, about 50% of patients will improve or become asymptomatic with left ovarian embolisation alone. Those that don’t may have a smaller vein which might have been missed or may have internal iliac vein varicosities contributing to the syndrome. If so, we will embolise these veins, though there are some concerns, and the capacity of the veins to be embolised must first be determined with an inflated balloon catheter. This patient got immediate relief of all symptoms. We will see her at 6-month follow-up to see if this is maintained.

What kind of feedback do you get from patients generally?
Our feedback is mainly positive. We do our best to give patients the full picture, including the eventuality of a repeat procedure being necessary, and they appreciate that effort.

Do you feel enough patients are offered this treatment, or is there room for improvement?
My gut feeling is that there must be more women out there suffering from this, but I have no evidence to back that up. The fact that our referrals are always from the same sources suggests that this is so – it seems improbable that some doctors and surgeons just naturally get referred depressed middle-aged women with debilitating but non-specific pelvic pain and labial varices!

How long have you been offering this treatment? Is it a satisfying line of work?
I've been working in this field for around 20 years. I first read about it in a journal and attended a workshop in the USA. Vascular surgical referrals for labial and upper thigh varicosities, as well as reports from colleagues in the USA like Anne Roberts, helped me develop my technique.
Any line of work that improves a patient’s lifestyle is very satisfying. Saving a life is an instant thrill, but improving it is a lasting one.

Dr. Tony Nicholson, IR

Not all in Vein

Dr. Tony Nicholson (3rd from left) with the team of Radiographers, Nurses and Catheter Lab Manager

Leeds General Infirmary is a large teaching hospital in West Yorkshire, England. The hospital was built based on the pavilion plan recommended by Florence Nightingale, and this ultra-modern hospital was officially opened in 1869 by HRH The Prince of Wales (later King Edward VII).
Leeds General Infirmary is currently one of the leading neurosurgery centres in the UK, and one of only 10 centres in the UK providing paediatric cardiology © Stanley Walker

C.M.
Size Matters
UAE applied to adenomyosis

The various sizes of embolisation particles © CeloNova BioSciences

In many situations having the right tools for the job can mean the difference between poor performance and success. The treatment of differing gynaecological conditions with uterine artery embolisation (UAE) is no different and it seems that when it comes to choice of embolisation particles, one size does not fit all.

Tailoring the procedure

UAE techniques are being refined to manage adenomyosis, classically a condition that is difficult to treat (see page 6). Past attempts to transfer the principles of UAE to the treatment of adenomyosis have often been disappointing, especially when it comes to recurrence of symptoms. This is changing, however, with new technical modifications and growing experience allowing a specific tailoring of the procedure.

Positive results

Promising higher rates of success at mid- and long-term follow-up are gradually being published for the first time, supporting UAE as an effective option for adenomyosis. Dr. Paul Lohle from St. Elisabeth Hospital, Tilburg, Netherlands, has had much experience treating the condition with UAE and spoke on the topic at GEST Europe* 2011 in Paris, France.

Improving techniques

Adenomyosis and uterine fibroids, although often occurring together have distinct characteristics, so if adenomyosis alone is being treated a slightly different approach is required. The key is use of smaller embolisation particles than would be used for fibroid embolisation.

Dr. Lohle explains that “the failures in the past might be due to the use of the type of particle and/or size, i.e. raw PVA (polyvinyl alcohol) with a particle size of 500-700 µm to embolise adenomyosis. This works with fibroids but is too big for sufficient deep and effective embolisation of adenomyosis.”

Spherical particles might be better suited to blocking very small and distal cylindrical vessel branches than irregular-shaped particles, although this logical concept does not always seem to correspond to real-life experience where success has also been reported with irregular particles.

Small but mighty

Dr. Lohle’s group uses smaller microspheres of 500 µm for embolisation of adenomyosis which are “necessary to really attack adenomyosis tissue. You need to have a very deep penetration of small spheres into these areas of adenomyosis in order to cut off the blood supply properly.”

Some groups have reported success in treating adenomyosis using a series of increasingly large embolisation particles during the procedure. This method of particle up-sizing has been termed the 1-2-3 protocol by one group, referring to the three successive size-ranges of particles that were used: first 150-250 µm, followed by 250-355 µm, then finally 355-500 µm. By staging the procedure in this way, it is thought that a deep and complete embolisation is more likely.

Further considerations

Dr. Lohle is certain that a complete embolisation, ensuring relief of symptoms, does not just directly depend on the size of embolisation material used:

“The embolisation endpoint also seems to be very important. You need to go until complete blockage of the distal and uterine artery in order to achieve enough infarction. So you need to be slightly more aggressive than with fibroids.”

A consequence of this approach is that patients can experience more pain around the procedure due to more extensive tissue ischaemia. This means that medication plans may be different in anticipation of this and some centres no longer use patient-controlled analgesia, as they would for fibroid embolisation, but employ epidural anaesthesia.

UAE for the future

There remain many unknowns with adenomyosis and much research is still needed. Nevertheless, the continuing innovation of IR is offering relief and support for countless women.

Mounting data are showing that it is unjustified not to consider UAE an option for patients with adenomyosis. With specific refinements to the procedure it is now becoming clear that the original apprehension surrounding the procedure in these cases may no longer be justified.

Adenomyosis may be more common than is currently thought, so it is an important development that UAE is finding its place as an effective option among the armamentarium of treatments for the condition, potentially sparing many women from unnecessary hysterectomy.

A.M.

* Global Embolization Symposium and Technologies, Europe, the largest and most significant meeting of its kind.
What do valuable artworks, forged banknotes, and women’s health have in common?

The answer is optical coherence tomography (OCT), an imaging technique that is already well established in ophthalmology for diagnosing ocular disorders such as macular degeneration and glaucoma.

This light-based technique is finding new areas of application due to its ability to visualise samples in three dimensions, at micrometric resolution, using non-harmful light.

This combination of high-resolution imaging, absence of ionising radiation, and a typical penetration depth of a few millimetres is what sets it apart from current techniques used for image-guided procedures such as ultrasound and MRI.

**Echoes of light**

Much as ultrasound imaging measures the echo of reflected sound waves, OCT measures the “echo” of light waves that is reflected when a beam of near-infrared light is shone on a sample, be it an anatomical structure or anything else of interest.

Whereas the naked eye might perceive reflected light as a diffuse glow or shine, with OCT the interfering “glare” can be discounted through data processing, allowing only the coherent rays to be measured, producing a focused, high-resolution cross-section of the target.

**Conmen and conservationists**

OCT is ideal for highly detailed sub-surface imaging and has been used to profile the layers that make up valuable paintings including underdrawings, paint coats and transparent covering varnish. This information can aid the work of conservationists and also assist in the detection of forgeries.

Forged banknotes may also be recognised with the assistance of OCT, which is being trialled to compare genuine currency with sophisticated counterfeits which, to the naked eye, may look identical.

**Medical progress**

OCT is also being developed in medical imaging as it can provide real-time information on live sub-surface tissue morphology at almost microscopic resolution in a way no other current imaging modality can.

This technology might yet have its greatest impact in the sphere of women’s health where potential future applications include assisting with the diagnosis and treatment of breast and cervical cancers.

- **Cancer diagnosis**
  
  As OCT can tell apart different tissue types and help identify biological structures it has potential as an optical guidance tool for breast biopsy. With a simple imaging technique the accuracy of biopsy can be increased and the need for repeat samples may be reduced. Furthermore, it is hoped that through technological improvements the histological information provided by OCT could even allow diagnosis through in vivo imaging alone, reducing or eliminating the need for excisional biopsy. OCT could also have a role as an adjunct to cervical cancer diagnosis, improving the accuracy of screening and reducing the need for repeat smears, which can give false negative results.

- **Lymph node assessment**
  
  Further to diagnosis of a primary lesion in breast cancer, effective management of the disease relies on assessment of the lymph nodes, involvement of which is a key sign of metastasis. Currently, biopsy or excision is performed so the tissue can be examined histologically. OCT is already being studied as a way of analysing the micro-architecture of lymph node samples and could prove to be a non-destructive alternative. Providing the necessary analysis from real-time in vivo imaging would prevent the loss of healthy lymph nodes.

- **Intervention guidance**
  
  OCT is being researched as an intra-operative imaging modality to guide oncological interventions and directly assess tumour margins, thus increasing the accuracy, effectiveness and efficiency of tumour excision and destruction.

Research into applications of OCT is ongoing and it is hoped that the unique strengths and advantages of this imaging technique can be harnessed to enhance the range of minimally invasive interventions available for many conditions including women’s cancers.

A.M.

With thanks to Prof. Piotr Targowski for his kind cooperation.
**Featured Trials**

**Percutaneous Removal and Margin Ablation for Breast Cancer**

Interventional radiology continues to make its mark on breast cancer treatment: the purpose of this study is to assess the efficacy and safety of a method that could become a same-day diagnosis and treatment protocol for small breast tumours.

**Study hypothesis**

The assumption is that the combination of two techniques can achieve negative margins in small, unicaentric breast cancers (≤1.5cm) in women between 18 and 40.

**Description of study**

Patients with a diagnosis of breast cancer diagnosed by Mammotome Breast Biopsy System (IVEB) will be assigned to a surgery date. On that day, the patient's axillary staging (lymph node analysis to classify cancer stage) will be done using IVEB in conjunction with MRI. This is followed by ultrasound to direct the removal of the tumour, touch preparation cytology for diagnosis, and ablation of margins using radiofrequency ablation (RFA). The study opened in March 2002 and is still recruiting participants.

**Aim of study**

Using the above procedure, the research group proposes to develop a comprehensive system for same-day diagnosis and treatment of patients with small breast lesions.

For further information, please contact:

Dr. Suzanne Klimberg  
Principal Investigator  
University of Arkansas For Medical Sciences  
Little Rock, Arkansas, 72205, United States

[www.ClinicalTrials.gov Identifier: NCT00574301]

**Fertility after UAE for the Treatment of Leiomyomas**

Uterine artery embolisation (UAE) has been established as an effective, safe, minimally invasive treatment for leiomyomas (see 5-year outcome article page 18). Now, interventional radiologists are working on research to explore UAE further to possibly expand the scope of this gentle treatment.

UAE has found its place in leiomyoma management as a treatment for women with symptomatic myomas. A team of investigators, headed by Dr. Jean-Pierre Pelage is researching the fertility results of UAE in women who wish subsequent pregnancy.

**Description of study**

30 patients, who would usually require multiple myomectomies by laparotomy (major surgery), will be embolised.

After one and two years, the conception and fertility rates will be calculated as well as the efficacy, complications and side-effects of UAE concerning the reproductive function. All women will have precise pre- and post-treatment evaluation using MRI, laparoscopy and hysteroscopy.

The pregnancy progress will be evaluated in a long-term study. This enquiry began in February 2009 and has just been completed.

**Aim of study**

The main goal of this study is to evaluate spontaneous fertility after uterine leiomyoma embolisation in women between 18 and 40. UAE’s utility will be tested against that of multiple myomectomy, the surgical comparator, which has shown poor fertility rates post-treatment and is more invasive than UAE.

For further information, please contact:

Dr. Jean-Pierre Pelage  
Principal Investigator  
Hopital Poissy St Germain En Laye  
Poissy, 78300, France

[www.ClinicalTrials.gov Identifier: NCT008397]
**Women’s Health Trials and Registries**

**Breast Cancer**

**Cryoablation Therapy in Treating Patients with Invasive Ductal Breast Cancer**

**Contact**
Dr. David M. Ota, American College of Surgeons Oncology Group, US

**Date opened**
September 2008

**Status**
Recruiting

**Description**
Cryoablation kills tumour cells by freezing them. This may be an effective treatment for patients with invasive ductal breast cancer. This phase II trial studies how well cryoablation therapy works in treating patients with invasive ductal breast cancer.

**clinicaltrials.gov Identifier:** NCT00723294

**Excision Followed by Radiofrequency Ablation for Breast Cancer (ABLATE)**

**Contact**
Ms. Laura Adkins, University of Arkansas for Medical Sciences, US

**Date opened**
June 2010

**Status**
Recruiting

**Description**
The purpose of this study is to evaluate, in a multicentre setting, the ability of radiofrequency ablation (RFA) of breast cancer lumpectomy sites to extend the "final" negative margin and consequently decrease the rates of re-operation.

**clinicaltrials.gov Identifier:** NCT00723294

**Menorrhagia**

**Medical Therapy versus Radiofrequency Endometrial Ablation in the Initial Treatment of Menorrhagia (ITOM)**

**Contact**
Dr. Abimbola O. Famuyide, Mayo Clinic, US

**Date opened**
August 2009

**Status**
Recruiting

**Description**
This study is the first to compare clinical efficacy and costs between oral contraceptive pills and global endometrial ablation in the initial management of menorrhagia and could potentially change the management of menorrhagia and impact millions of women who suffer from this condition.

**ClinicalTrials.gov Identifier:** NCT01165307

**Uterine Artery Embolisation**

**Uterine Artery Embolization in the Treatment of Postpartum Uterine Hemorrhage**

**Contact**
Dr. Suvranu Galguli, Brigham and Women’s Hospital and Harvard Medical School, US

**Date opened**
January 2005

**Status**
Closed, results published

**Description**
The retrospective study demonstrated that the risk of serious complications after uterine artery embolisation (UAE) in patients with a large fibroid burden is not increased. Clinical long-term results are comparable to other patients treated with UAE. Therefore, a large fibroid burden should not be considered a contraindication for UAE.

**www.jvir.org, February 2011**

**Uterine Fibroid Treatment: Magnetic Resonance Imaging-guided Ultrasound Surgery (MRgFUS) versus Uterine Artery Embolization (UAE)**

**Contact**
Ms. Lisa G. Peterson, Mayo Clinic, US

**Date opened**
October 2009

**Status**
Recruiting

**Description**
The primary goal of this study is to compare the safety and effectiveness of two standard fibroid treatments: MRgFUS and UAE.

**ClinicalTrials.gov Identifier:** NCT00995878

Please note, this does not constitute an exhaustive overview of trials and registries. If you are aware of a trial or registry which may be of interest to our readers, please feel free to contact us at info@intervention-iq.org.
Interventional radiologists also provide care for patients referred by non-hospital physicians. These patients may be managed as outpatients, or inpatients in close collaboration with other clinicians from the appropriate departments. For example, a patient referred for uterine fibroid embolisation is admitted to the gynaecology department.

Building such effective and loyal partnerships is not always easy, however despite the challenges, a great majority of image-guided interventions at our hospital is performed by radiologists.

In your experience, how do diagnostic and interventional radiologists work together best in a clinical setting?

In France, radiology remains officially and in practice a unique specialty. On an organisational level, the “conseil inter-professionnel de la radiologie” constitutes the unified and official representation of all radiologists, joining together various organisations that represent radiologists. In unity there is strength!

In France, close and synergistic collaboration exists between diagnostic and interventional radiology, as the high quality of the diagnostic imaging allows optimal use of IR, which in turn induces diagnostic imaging assessment and follow-up. A number of French radiologists are exclusively interventional radiologists.

In my opinion, to be recognised as an interventional radiologist one must first of all be an accomplished organ-specialised radiologist, and be able to discuss indications of interventional procedures with referring physicians. On the other hand, the various organ-specialised interventional radiologists maintain a common foundation of skills, they share education and training programmes: for example, percutaneous access, image-guiding, biomaterials and devices, radioprotection, and sedation are always relevant.

Could you tell us more about your involvement in the treatment of rare vascular diseases?

Our department has been certified as one of the centres of competence for rare vascular fibromuscular dysplasia (FMD) because of our longstanding academic and clinical involvement in this field.
Our group is included in a fourteen-centre network in France, which associates teams of cardiologists, nephrologists, internists, surgeons, and diagnostic and interventional radiologists.

The French government decided to create co-ordinated networks of care for rare vascular diseases, in order to homogenise practice and data-collection, and to ensure optimal care provision to all patients in all the country.

Guidelines for diagnosis and care are produced by these networks, as we did for FMD. The majority of practitioners encounter only a few cases a year for each of these pathologies so the guidelines are intended to contribute to more accurate decisions and follow-up, and ultimately the best possible patient care.

What is the value of IR in the management of FMD?

Radiology provides the opportunity for an accurate, non-invasive detection as well as a percutaneous treatment for the majority of FMD cases causing hypertension. In fact, dilatation of FMD-related renal artery stenosis is recognised today as the first-line treatment.

In over 50% of cases, PTRA (percutaneous transluminal renal angioplasty) safely cures hypertension, which is a crucial therapeutic outcome in these often young patients.

How do the growing challenges of managing rare vascular diseases provide opportunities for the development of new techniques?

The management of ignored or sometimes neglected rare diseases is a fascinating area and patients who are affected deserve our attention.

Concerning these particular diseases, multidisciplinary collaboration is often excellent, gathering highly motivated physicians, who are less concerned with turf battles.

The minimally invasive therapies of IR can really shine in this environment and management of these patients is a challenging opportunity for IR to assert its innovative potential and seriousness of approach.

In which directions would you say IR stands to develop the most in the future?

Encouraging research and innovation is, more than ever, fundamental, and organisations like CIRSE (Cardiovascular and Interventional Radiological Society of Europe) help with this.

In France, a future clinical challenge of IR seems to be that of supporting the evolution of ideas in oncology, leading to targeted therapies, personalised treatments, and improved quality of life. There is also great interest in IR techniques in the management of trauma, as a natural extension to diagnostic imaging; and also the continued growth of image-guided interventions in pain management.

As for the political development of the profession, the official recognition of a special qualification for interventional radiologists and the requirement for rigorous quality standards of care are the keys to our future!

Your work must keep you very busy, but when you’re not occupied with IR what do you like to do in your spare time?

I have a very happy family life with three grown children and their mother. Cross-country jogging and kayaking in the countryside of the Auvergne region, listening to chamber music and cooking fully occupy the rest of my life!

A.M.

Fibromuscular dysplasia (FMD) involves abnormal growth of artery wall cells, causing a narrowing of the artery. Vessels in the kidneys are most often affected as well as those supplying the brain. A range of complications can ensue, including high blood pressure, stroke, heart attack, and arterial aneurysm.

The causes of FMD are not well understood and in many cases diagnosis is incidental when patients are scanned for some other reason. This is part of the reason why the true incidence of the condition is unknown.
What is it like working in the IR setting? How does it vary from country to country, or is your hospital an exception?

Many IRs have long been pointing out the advantages of dedicated IR nurses. Some have been granted them; many more have not. But the experience of those who are blessed with these specialised professionals shows that it can make a huge difference to the level of service that skilled IRs can provide to their patients.

IQ spoke to three full-time IR nurses, Ms. Ioanna Kotsioumpa (IK) from Greece, Ms. Patricia Liuzzo (PL) from Italy and Ms. Rita Ling (RL) from the UK, to see how they joined their IR team, what they bring to their colleagues and patients, and the situation of IR in their countries.

Are dedicated nurses common working practice in your country, or is your hospital an exception?

IK: Dedicated nursing is common practice in Greece. I think this is a good development because there is an awareness of communication that has developed between nurses and the rest of the team. What we appreciate is the presence of dedicated nurses among them.

RL: It is similar in the UK. The majority of the hospitals I have worked in have an IR suite with dedicated staff, which I consider to be essential. This role is unique to the nurses in the IR department, unlike other specialties. The role of the IR nurse is quite unique within the nursing community in that, unlike other specialities, the radiology nurse needs a deeper knowledge of not just one, but several specialties and fields, for example urology, gastrointestinal and vascular.

PL: Things are a little different in Italy. Even though IR has been around for many years, it is not well known, but in recent years it has been expanding a lot, so things may soon change. But for now, my case is definitely exceptional.

What is it like working in the IR setting? How does it differ from other areas of nursing?

IK: There are many differences for a nurse working in the IR unit compared with other departments. These include training in special equipment, the short stay of the patient at the unit, radiation protection, an irregular timetable due to emergencies night and day, and team work. Trained and experienced nurses can take initiatives during the procedure and they have a greater role in the patient’s care and treatment than in other departments where they simply follow doctors’ orders. As I am also trained as a scrub nurse, I am able to teach junior doctors how to prepare materials before and during the procedure, and how to correctly position the patient.

RL: I agree — I thoroughly enjoy working in the IR team and have gained lots of knowledge and experience in a wide range of cases and specialities. I have become familiar with many different radiological procedures, both vascular and non-vascular. I also enjoy being able to assist the radiologist as a scrub nurse or a circulating nurse, hence expanding my knowledge, skills and experience.

What difference does IR make to a patient’s hospital experience?

IK: There are many differences, most notably that the patient’s stay in the IR unit is always short. As Patricia says, what makes a big difference to our job is the use of conscious sedation, which is a good thing for the patient’s health, but can lead to some anxiety regarding the procedure. This is another reason why dedicated nurses are so necessary in an IR unit, as we keep the patient calm and comfortable.

Do you think that there is sufficient knowledge among management and your clinical colleagues about what IR department staff do on a daily basis?

IK: Many colleagues have little knowledge of our role and the interventions we help carry out. But those who are aware of our work (colleagues in other invasive units, e.g. cardiology, gastroenterology, etc.) recognise the important contribution of nurses to the procedures. Raising awareness of what is done in the IR unit would be of benefit to all patients and members of staff, and I also think perhaps nurses’ groups should do more to publicise the contribution of dedicated nurses. It would also be helpful if faculties of nursing would run specialised courses on IR nursing.
Dedicated Nurses

Ms. Ioanna Kotsioumpa works at the University Hospital in Athens, Greece. She became involved in IR nursing purely by chance. “I work exclusively in the IR department as a nurse, and have done so for the last four years.”

Ms. Patricia Liuzzo works in Sapienza University Hospital in Rome, Italy, and was assigned to the IR ward after ten years’ work in intensive care. “In my hospital, I work exclusively in radiology, but in my spare time I teach critical care and intensive care nursing, including IR.”

Ms. Rita Ling works at St. George’s Hospital, London, in one of the largest IR departments in the UK. She joined the IR department at the recommendation of a friend. “Currently we have eight nurses in IR, increased by two from last year due to the increased demand in workload and more advanced cases.”

What advantages do dedicated nursing staff bring to the department and hospital?

RL: Every IR department should have dedicated nursing staff – we are a vital component in the provision of patient care. We provide various kinds of physical and psychological support to the patient undergoing a radiological procedure, for example, allaying fears and anxieties, as well as general nursing work such as administering medication and applying treatment and dressings. Nurses also participate in maintaining and monitoring adequate stock levels, ensuring sufficient supplies are available in the department within budgetary constraints. I also conduct annual or biannual stock checks and negotiate better product prices with sales representatives.

PL: It’s true, dedicated IR nurses can really help patients. The IR procedure itself involves shorter hospitalisation and requires much less post-operative care. Adopting this approach and supporting it with trained staff can optimise the hospital’s resources. I also conduct annual or biannual stock checks and negotiate better product prices with sales representatives.

IK: Yes, the contribution of dedicated nursing staff cannot be disputed – their contribution to the success of an intervention is essential. They are more familiar with the materials, procedures and potential complications than a general nurse, allowing a greater efficiency and better outcome, especially in emergency situations. For example, a patient suffering from life-threatening acute renal haemorrhage after a car accident needed an emergency embolisation. A dedicated nurse had ordered the appropriate stocks of embolic material for those kinds of cases, and was able to adequately provide haemodynamic support during the procedure. The patient was quickly and adequately treated and his life was saved.

Does specialisation offer any advantages for the nurses themselves?

RL: The advantages are to be able to work not only in a ward environment, but also in other environments that involve radiological procedures such as cardiology, neurology, endoscopy, etc. It’s very interesting and challenging.

IK: The advantages for me are the moral satisfaction of making a difference, increased knowledge through continuous training and more time off than in other units (due to radiation exposure).

Our three nurses agree that an IR department would find it difficult to function with constantly rotating nursing staff. Their role is an essential one – caring for patients who find themselves in the unexpected situation of being conscious during procedures, informing these patients of what to expect, looking after stocks and supplies, assisting in highly technical procedures and attending to the puncture wounds that are part of the IR territory. These are tasks that could overwhelm a general, untrained nurse – and yet, even among the minority of nurses who specialise in IR, there is precious little formalised training.

Most training takes place on the job, and is provided by senior colleagues. But as Rita Ling points out:

Recent innovations and current advances mean that more and more medical procedures are being done using radiological techniques. Therefore, it is important that today’s students of nursing are made aware of the role of dedicated IR nursing and recognise the specialty itself. It would be very useful in the future to have radiology courses for nurses to further broaden their knowledge, skills and experience.

IQ would like to thank Dr. Katerina Flittr, Dr. Elias Brountzos, Dr. Fabrizio Fanelli and Dr. Robert Morgan for their assistance.

C.M.
Trials and Registries

Trial: a study carried out with the purpose of testing a new medical treatment on a defined group of people. The results are compared with a group that are treated using another method and/or a control group.

Registry: a (retrospective) collection of data about a certain treatment or illness. Using the compiled data, conclusions can be drawn about effectiveness of a particular treatment method.

Angioplasty

Balloon Angioplasty versus Primary Stenting for the Treatment of Femoropopliteal Artery Chronic Total Occlusions (FACTORY)

Contact
Dr. Dimitrios Siablis, Patras University Hospital, GR

Date opened
December 2010

Status
Recruiting

Description
This is a multicentre, double-arm randomised trial investigating plain balloon angioplasty versus primary placement of self-expanding Nitinol stents after endovascular recanalisation of femoral CTOs.

ClinicalTrials.gov Identifier: nct01268722

Carotid Stenting

CHOICE: Carotid Stenting for High Surgical-Risk Patients

Contact
Dr. William Gray, Abbott Vascular, US

Date opened
October 2006

Status
Recruiting

Description
The CHOICE study will provide data on Abbott Vascular’s Carotid Stent Systems and Embolic Protection Systems when used by a broad group of physicians under commercial use conditions.

ClinicalTrials.gov Identifier: NCT00406055

Haemoptysis

Comparison of Bronchial Artery Embolization (BAE) and Medical Measures in Non-severe Acute Hemoptysis of Mild-to-moderate Abundance (ARTEMHYS)

Contact
Dr. Muriel Fartoukh, Tenon Hospital, FR

Date opened
March 2011

Status
Recruiting

Description
The study is a multicentre, randomised study involving two parallel groups of patients with non-severe acute haemoptysis of mild-to-moderate abundance related to a systemic bronchial or non-bronchial hypervascularisation. It compares the bronchial artery embolisation combined with medical measures and the medical measures alone in this field.

ClinicalTrials.gov Identifier: NCT01278199

HIFU

High Intensity Focused Ultrasound (HIFU) for Parathyroid Adenoma

Contact
Dr. Radu Mihaei, Oxford Radcliffe Hospitals NHS Trust, UK

Date opened
January 2011

Status
Recruiting

Description
This study aims to determine whether HIFU treatment is a safe and effective alternative to an operation to remove all or part of the affected gland.

ClinicalTrials.gov Identifier: NCT01291498

IVC Filter

CIRSE Caval Filter Retrieval Registry

Contact
Prof. Michael Lee, Beaumont Hospital, IR

Date opened
December 2010

Status
Recruiting

Description
The primary end point is to assess the success of filter retrieval among the different filter types. The secondary end points include assessing complications during retrieval and dwell time of different filter types.

http://host-dendrite.com/ivcfret
### Trials and Registries

#### IVC Filter Registry

**Contact**  
Mr. William Kuo, Stanford University School of Medicine, US  
Date opened  
June 2010  
Status  
Recruiting  
Description  
A data registry for all patients who undergo IVC (Inferior Vena Cava) filter placement or retrieval at Stanford.  
ClinicalTrials.gov Identifier: NCT01158482

#### Traditional (Traditional Chemoembolization) TACE versus Microsphere TACE (PRECISION-IT)

**Contact**  
Dr. Rita Golfieri, Azienda Ospedaliero-Universitaria, IT  
Date opened  
March 2008  
Status  
Recruiting  
Description  
The primary aim of this study is to compare 2-year survival of patients randomised to selective traditional TACE or selective TACE via microspheres loaded with doxorubicin.  
ClinicalTrials.gov Identifier: NCT00936689

#### Treatment of Hepatocellular Carcinoma with Radiofrequency Ablation (RFA) Associated with Postoperative TACE

**Contact**  
Dr. Ma Kuansheng, Institute of Hepatobiliary Surgery, Southwest Hospital, CN  
Date opened  
December 2008  
Status  
Recruiting  
Description  
The purpose of this study is to assess whether the outcome of hepatocellular carcinoma could be improved by radiofrequency ablation (RFA) associated with postoperative transhepatic arterial chemoembolisation.  
ClinicalTrials.gov Identifier: NCT00730860

#### Trial of Beads versus Doxorubicin Eluting Beads for Arterial Embolization of Hepatocellular Carcinoma

**Contact**  
Dr. Karen T. Brown, Memorial Sloan-Kettering Cancer Center, US  
Date opened  
November 2007  
Status  
Recruiting  
Description  
The purpose of this study is to evaluate the effect of blocking the blood vessels to the tumour in the liver with small beads alone (Bead Block) versus doxorubicin-releasing beads (a chemotherapy agent).  
ClinicalTrials.gov Identifier: NCT00539643

#### Radiofrequency Ablation, Chemoembolization, and/or Radioembolization in Treating Patients with Liver Cancer that Cannot be Removed by Surgery

**Contact**  
Dr. Riad Salem, Northwestern University, US  
Date opened  
August 2009  
Status  
Recruiting  
Description  
This randomised phase II trial investigates the effectiveness of radioembolisation compared with chemoembolisation and/or radiofrequency ablation in treating patients with liver cancer that cannot be removed by surgery.  
ClinicalTrials.gov Identifier: NCT00956930

#### Radiofrequency Ablation Combined with Chemotherapy for Pulmonary Tumors (FACPT)

**Contact**  
Dr. He Jianxing, First Affiliated Hospital of Guangzhou Medical College, CN  
Date opened  
November 2009  
Status  
Recruiting  
Description  
The purpose of this study is to assess short and long-term outcomes after radiofrequency ablation (RFA) combined with chemotherapy for pulmonary malignancies in patients who are not candidates for surgical resection.  
ClinicalTrials.gov Identifier: NCT01105182

IQ takes no responsibility for the content of the individual trials and registries; please refer to their source for further information.

Please note, this does not constitute an exhaustive overview of trials and registries. If you are aware of a trial or registry which may be of interest to our readers, please feel free to contact us at info@intervention-iq.org.
The Early Days of IR

It takes a rare kind of mind, diligent persistence and not a little luck to invent a device that will change the lives of a few patients. What then, are we to make of a mind which has made dozens of such inventions, and which continues to explore the outer limits of medical engineering well into its 80s? A mind which has touched the lives of nearly half a million patients? That is a rare kind of genius indeed, and one which quietly works in a small workshop in Minnesota. That is the mind of Dr. Kurt Amplatz.

It all started in his home village of Weistrach, in Lower Austria. Between his father being the village doctor and his uncle being a research chemist, Amplatz began dabbling in science at a young age, making plastics and experimenting with (failed) mouse poisons. At university, he briefly flirted with engineering and chemistry before making medicine his vocation. However, three weeks as a locum for his father following graduation was enough to make him realise that front-line medicine wasn’t for him, and that his passion lay in research.

A one-year internship in the U.S. in 1952 turned into a 60-year career, 40 years of which were spent at the University of Minnesota, where he developed many devices for neuroradiology, uroradiology and cardiology, some of which were made in his neighbour’s garage (such as a machine for injecting dye through catheters into children’s hearts for angiograms).

Some have since been replaced by advances in diagnostic imaging technology, but others remain staples of both diagnosis and therapy, such as the Amplatz access needle, guidewires and thrombectomy devices; renal dilators; vena cava filters; the slot cardiovascular device to limit scattered radiation; aneurysm repair grafts; a balloon catheter to measure the size of a hole in the heart; and the GooseNeck® Snare, which can retrieve broken catheters from a patient’s vessels, reposition stents and remove foreign bodies from the urinary, GI and biliary tracts. But the most groundbreaking invention of all was to follow his retirement from clinical practice...

“The most important step in my professional career was the idea to form devices which can be introduced percutaneously from a braiding of Nitinol wire. Nitinol is an alloy of nickel and titanium discovered by the American Navy in the 60s, which has two unique properties: 1) super-elasticity – a much better spring than any known spring wire; and 2) shape memory – Nitinol will return to its original form if heated to a certain temperature. This second property was discovered by chance; following damage from night-time enemy shelling, the Navy’s Nitinol armour plates unexpectedly returned to their original shape when heated by the morning sun.

“Intrigued by the possibility of producing percutaneous devices made of Nitinol, I formed a company with my son, Curtis, who had experience in working with this alloy. I rented a small space in a warehouse for $75 a month, bought two used braiders for $2,500, a complete shop and a small furnace to perform the required heat treating of Nitinol. Curtis produced devices according to my designs and I performed the experiments in my research lab at the University of Minnesota.”

The two Amplatzes created a prototype for the AMPLATZER® Septal Occluder – a percutaneous device that has replaced open-heart surgery as the treatment of choice for atrial septal defect, or “hole in the heart”. The major advantage of this innovation is that it spares those with such heart defects (mostly small children, but adults too) from dangerous surgery and a lengthy recovery.

“After a few years, differences with my son led me to found a new company, AGA Medical Corporation. This company produces many cardiac and vascular devices which can be delivered via catheter. I am proud to say that over 400,000 patients, mostly children, carry an AMPLATZER® device in their heart.”

AGA Medical Corporation was recently purchased by St. Jude Medical for $1.3 billion. These days, Dr. Amplatz leaves the business side to others, as he prefers to devote himself to what he does best – inventing devices that will save lives.

With sincere thanks to Dr. Kurt Amplatz

C.M.
Trauma
The role of image-guided, minimally invasive treatment

Trauma medicine is something we are all familiar with from TV, but road traffic accidents, falls, stabbings and gunshot wounds are ideal territory not just for televised drama, but also for minimally invasive medicine.

IQ investigates the role that interventional radiology can play in treating emergency patients, and how it can best be integrated into existing trauma response protocols.

Logistics will be a key feature – when a patient is bleeding to death, there is no time to lose. How can hospitals ensure that these patients are treated in a timely fashion, and how can they ensure that these fragile, critical patients receive the gentlest care that's available? Find out more in September’s IQ…

Trauma Interventions

If you are interested in contributing to IQ, please contact info@intervention-iq.org

Also featured:
- The Changing Shape of Illness: Obesity and IR
- Radiation Protection
- IR Training Programmes – A Model Approach