The Royal Australian and New Zealand College of Obstetricians and Gynaecologists
Excellence in Women's Health

CATEGORY: USEFUL GUIDANCE

Uterine artery embolisation for the treatment of uterine fibroids

This statement has been developed and reviewed by the Women's Health Committee and approved by the RANZCOG Board and Council.

A list of Women's Health Committee Members can be found in Appendix A.

The committee acknowledges the contribution of
Dr Tamara Hunter to this document.

First endorsed by RANZCOG: March 2008
Current: March 2020
Review due: March 2023

Objective: To provide advice on the treatment of fibroids by uterine artery embolisation (UAE).

Target audience: All health practitioners providing gynaecological care, and patients.

Values: The evidence was reviewed by the Women's Health Committee (RANZCOG) and applied to local factors relating to Australia and New Zealand.

Background: This statement was first developed by Women's Health Committee in March 2008 and most recently reviewed in March 2020.

Funding: The development and review of this statement was funded by RANZCOG.

1. Summary of recommendations

Recommendation 1	Grade
Due to the lack of good quality evidence, caution should be employed to avoid routine use of UAE in young patients with fibroid disease wishing to conceive.	Consensus-based recommendation
Recommendation 2	**Grade**
Patients should be counselled about the possibility of a malignancy especially if there are risk factors such as a rapidly enlarging fibroid[1], postmenopausal women[2], racial group[3], previous radiation to the pelvis[4] or retinoblastoma gene mutation carrier[5]. There should also be an increased index of suspicion in continued growth of a fibroid after UAE.	C References 1-5
Recommendation 3	**Grade**
Patients should be counselled about the possibility of requiring subsequent hysteroscopic or laparoscopic retrieval of intracavity or subserosal pendunculated fibroids post-UAE.[6] Alternatively, elective surgical management of such lesions may be preferred.	C Reference 6
Good Practice Point	
Patients considering UAE should be provided detailed counseling about the procedure, and alternative options, to facilitate informed decision-making.	Consensus-based
Recommendation 4	**Grade**
Patients who desire (or may desire) pregnancy should be advised that the effects of UAE on fertility and pregnancy are uncertain.[6]	Consensus-based Recommendation Reference 6

2. Introduction and Definition

Fibroids are a common gynaecological condition which can result in problems including heavy menstrual bleeding, anaemia, pain and bulk symptoms. Uterine artery embolisation (UAE) has been reported as an effective and safe method of minimally invasive, uterine-sparing, treatment of symptomatic fibroids.

Uterine artery embolisation (UAE) involves the placement of an angiographic catheter into the uterine arteries via the common femoral artery, followed by injection of embolic particles until the flow becomes sluggish in both uterine arteries.[7] This treatment aims to reduce uterine blood flow at the arteriolar levels, producing ischemic injury to the fibroids, causing necrosis and shrinkage, whilst allowing the surrounding normal myometrium to recover under supply of vaginal and ovarian collateral circulations. There is no strong evidence of any one embolic particle being superior to another in terms of outcomes.[8]

3. Discussion and Recommendations

3.1 Comparison to other treatment options

UAE is intended to produce structural change within a fibroid and carries risks of similar complications to those seen at surgery. As such, it should be compared to surgical interventions such as myomectomy (in women wishing to conserve their uterus) or hysterectomy[9], not medical treatments for symptom control (eg. IUD containing levonorgestrel).

A 2014 Cochrane review [10] looked at the benefits and risks of UAE versus surgical interventions (myomectomy & hysterectomy) for symptomatic fibroids. This review found:

- No significant difference in patient satisfaction at both 2 years and 5 years
- Similar intra-procedural complications
- No difference in short- or long-term major complications
- UAE had a significantly reduced
    - Length of procedure
    - Length of hospitalisation
    - Time to resumption of normal activities
- UAE had an increased
    - Rate of short- and long-term minor complications
    - Number of unplanned reviews and re-admissions after discharge (OR 2.2-2.8)
    - Surgical re-intervention rate (OR 3.7 at 2 years; 5.8 at 5 years)
- There was no difference in long-term ovarian failure rates (based on FSH)
- Myomectomy may have a greater chance of success in women wanting to achieve pregnancy, but the quality of evidence is poor for pregnancy rates, live birth rates and miscarriage rates [37]

The latest report from the EMMY trial[11] revealed a hysterectomy rate in the UAE group of 35% by 10 years. 5% were performed immediately for failed bilateral UAE. By the end of 2 years a further 19% of the UAE group had resorted to hysterectomy (due to inadequate response between 4- and 24- months post-UAE). An additional 10% ultimately had a hysterectomy for persisting symptoms between 2- and 10- years post-UAE, with one additional hysterectomy in the group for prolapse. Thus 65% of women have avoided hysterectomy by undertaking UAE, but the high rate of re-intervention may negate any initial cost-benefit provided by UAE[10]. The authors conclude that for women who are candidates for hysterectomy due to symptomatic fibroids should be counselled about the alternative option of UAE.

3.2 Morbidity, mortality and complication rates

Complications of UAE for fibroids can be classified as:

Procedural – groin haematoma, arterial thrombosis, pseudo-aneurysm

Early – 'embolisation syndrome' (fever, nausea, pain, malaise), vaginal discharge, pelvic infection (including pyomyoma[12]), expulsion of necrotic submucous fibroid

Late – ovarian insufficiency, failure of response, re-intervention

Minor complications occur with a rate of about 30-45%; major (life-threatening, potentially associated with permanent sequelae or requiring surgical intervention) complications about 5%.[10]

A 2013 meta-analysis reviewed the complications of UAE relative to surgery for symptomatic fibroids and noted no significant differences in major and minor complications between the groups.[13] The authors express caution in interpreting these results due to the small numbers in the trials and the potential for complication rates being related to operator experience. There is also heterogeneity between studies in the classification of complications, some of which may be considered under either group, depending on severity.

Clinical trials revealed the most common complications associated with UAE to be

- Discharge and fever – 4%
- Bilateral UAE failure (4%)
- Postembolisation failure (2.86%)

A rare, though concerning, complication is VTE (0.286%).

Amongst over 120 randomised control studies, non-randomised studies and case reports involving over 11,000 UAE patients, there have been 5 published case reports of deaths following embolisation (secondary to non-target embolisation, VTE and sepsis), though none since 2009.[14-18]

Delayed diagnosis of an endometrial sarcoma or uterine leiomyosarcoma has been reported.

3.3 UAE and reproductive potential

UAE remains controversial in women desiring pregnancy. Some authors favour UAE only for women who no longer desire childbearing [19,20] whereas others have a more permissive approach for childbearing women, offering UAE in case myomectomy is not a desirable option, either because of surgical risk, patient refusal or failure of previous surgery. [21]

The concerning outcomes that could affect reproductive potential include non-targeted embolisation leading to ovarian embolisation and impaired ovarian reserve [22], decrease in endometrial volume due to an inadequate blood supply [23] and an otherwise healthy myometrium adversely affected by embolisation leading to contraction disturbance and implantation failure. [24]

3.3.1 – Ovarian Reserve

A retrospective study of ovarian reserve in women undergoing UAE for symptomatic fibroids [25] noted a significant reduction in AMH and AFC in women 3 months after UAE. Women under the age of 40 showed a partial recovery of AMH by 12 months, but women over 40 did not. It should be noted that this study used temporary embolic agents for UAE, whereas most reports are of permanent embolic agents.

3.3.2 – Fertility rates

The recent Cochrane review [10] revealed only one RCT comparing fertility outcomes in women with fibroids randomised to UAE or myomectomy. [26] Pregnancy rates were significantly higher, with lower miscarriage rates, in the myomectomy group versus the UAE group. Obstetric and perinatal outcomes in ongoing pregnancies were

similar between the groups. However, due to the small numbers and quality of this study the results are questionable.

A further prospective cohort study has been undertaken to assess the impact on the reproductive potential of UAE for symptomatic fibroids.[20] This study used a 'fertility-sparing' protocol with limited embolisation of both uterine arteries with particles > 500micrograms. Even so, the monthly fecundability in this study population was 0.1%. The study lacked a control group with surgical treatment. The effect of the fibroids themselves on the elevated infertility rate in this group, as well as other confounding factors, such as previous surgery, made it difficult to interpret the outcome. The authors commented however that UAE obviously did not improve the fertility potential of the patients and may in fact have worsened it.[20]

3.3.3 – Pregnancy outcomes

A meta-analysis [27] of all documented pregnancies occurring in women after UAE for fibroids compared outcomes to matched controls of pregnant women with untreated fibroids. It described no difference in pregnancy outcomes (preterm birth, IUGR, malpresentation) but significantly higher rates of caesarean delivery, post-partum haemorrhage and miscarriage following UAE.

There is an urgent need for clinical trials assessing the actual effect of UAE on future fertility. Such trials are currently underway. [28]

Recommendation 1	Grade
Due to the lack of good quality evidence, caution should be employed to avoid routine use of UAE in young patients with fibroid disease wishing to conceive.	Consensus-based recommendation

3.4 Case Selection

Current pregnancy and recent or current pelvic infection are contra-indications to UAE.[6]

Patients should be prepared to accept the possibility of hysterectomy in the event of complications.[6]

The possibility of a malignancy should be considered, especially if a fibroid is rapidly enlarging or associated with unexplained abnormal uterine bleeding or the presence of ascites. Unexpected findings of malignancy at surgery for suspected benign disease are also associated with post-menopausal women[2], certain racial groups[3], previous radiation to the pelvis[4] and the presence of the retinoblastoma gene mutation[5]. UAE is contra-indicated when there is significant doubt about benign disease. Case reports have suggested a delay in diagnosis of uterine sarcoma in patients who previously had UAE for presumed benign fibroids, due to lack of tissue sampling. [29,30] Authors suggest appropriate imaging assessment prior to UAE (eg MRI or Doppler ultrasound). There should also be an increased index of suspicion in continued growth of a fibroid after UAE.

Narrow-stalked, pedunculated and large intracavity submucosal fibroids are at risk of detaching and significant sloughing into the endometrial cavity post embolisation, leading to cervical obstruction and occasionally sepsis. Plans for possible endoscopic retrieval should be in place post embolisation. Pedunculated subserosal fibroids are also at risk of detachment post-embolisation and arrangements may need to be made for laparoscopic retrieval.[6]

Recommendation 2	Grade
Patients should be counselled about the possibility of a malignancy especially if there are risk factors such as a rapidly enlarging fibroid[1], postmenopausal women[2], racial group[3], previous radiation to the pelvis[4] or retinoblastoma gene mutation carrier[5]. There should also be an increased index of suspicion in continued growth of a fibroid after UAE.	C References 1-5
Recommendation 3	**Grade**
Patients should be counselled about the possibility of requiring subsequent hysteroscopic or laparoscopic retrieval of intracavity or subserosal pendunculated fibroids post-UAE.[6] Alternatively, elective surgical management of such lesions may be preferred.	C Reference 6

3.5 Patient preparation

Gynaecologists should counsel the patient about the available options and if the patient wishes to consider UAE, referral should be made to an experienced vascular interventional radiologist. The patient should receive a clear description of the outcomes of UAE in comparison with the alternatives, as well as a full discussion of the complications and re-intervention rates. Patients who desire, or may desire, future pregnancy should be advised that the effects of UAE on fertility and pregnancy are uncertain, and should only proceed after a fully-informed discussion.[6]

Prior to embolisation there should be an established plan for the responsibilities of both radiologist and gynaecologist for subsequent review and management of any complications.[6]

Good Practice Point	Grade
Patients considering UAE should be provided detailed counseling about the procedure, and alternative options, to facilitate informed decision-making.	Consensus-based
Recommendation 4	**Grade**
Patients who desire (or may desire) pregnancy should be advised that the effects of UAE on fertility and pregnancy are uncertain.[6]	Consensus-based Recommendation Reference 6

4. References

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5. Links to other College statements

Fibroids in Infertility (C-Gyn 27)
https://www.ranzcog.edu.au/RANZCOG_SITE/media/RANZCOG-MEDIA/Women%27s%20Health/Statement%20and%20guidelines/Clinical%20-%20Gynaecology/Fibroids-in-Infertility-(C-Gyn-27)-Review-November-2014.pdf?ext=.pdf

Consent and the Provision of Information to Patients in Australia regarding Proposed Treatment (C-Gen 02a) https://www.ranzcog.edu.au/RANZCOG_SITE/media/RANZCOG-MEDIA/Women%27s%20Health/Statement%20and%20guidelines/Clinical%20-%20General/Consent-and-provision-of-information-to-patients-in-Australia-(C-Gen-2a)-Review-July-2016.pdf?ext=.pdf

Consent and Provision of Information to Patients in New Zealand regarding Proposed Treatment (C-Gen 02b) https://www.ranzcog.edu.au/RANZCOG_SITE/media/RANZCOG-MEDIA/Women%27s%20Health/Statement%20and%20guidelines/Clinical%20-%20General/Consent-and-provision-of-information-NZ-(C-Gen-2b)-Review-March-2016.pdf?ext=.pdf

Evidence-based Medicine, Obstetrics and Gynaecology (C-Gen 15)
https://www.ranzcog.edu.au/RANZCOG_SITE/media/RANZCOG-MEDIA/Women%27s%20Health/Statement%20and%20guidelines/Clinical%20-%20General/Evidence-based-medicine,-Obstetrics-and-Gynaecology-(C-Gen-15)-Review-March-2016.pdf?ext=.pdf

6. Patient information

A range of other RANZCOG Patient Information Pamphlets can be ordered via:

https://www.ranzcog.edu.au/Womens-Health/Patient-Information-Guides/Patient-Information-Pamphlets

Appendices

Appendix A Women's Health Committee Membership

Name	Position on Committee
Professor Yee Leung	Chair and Board Member
Dr Gillian Gibson	Deputy Chair, Gynaecology
Dr Scott White	Deputy Chair, Obstetrics and Subspecialties Representative
Associate Professor Ian Pettigrew	Member and EAC Representative
Dr Kristy Milward	Member and Councillor
Dr Will Milford	Member and Councillor
Dr Frank O'Keeffe	Member and Councillor
Professor Sue Walker	Member
Dr Roy Watson	Member and Councillor
Dr Susan Fleming	Member and Councillor
Dr Sue Belgrave	Member and Councillor
Dr Marilyn Clarke	ATSI Representative
Associate Professor Kirsten Black	Member
Dr Thangeswaran Rudra	Member
Dr Nisha Khot	Member and SIMG Representative
Dr Judith Gardiner	Diplomate Representative
Dr Angela Brown	Midwifery Representative, Australia
Ms Adrienne Priday	Midwifery Representative, New Zealand
Ms Ann Jorgensen	Community Representative
Dr Rebecca Mackenzie-Proctor	Trainee Representative
Dr Leigh Duncan	Maori Representative
Prof Caroline De Costa	Co-opted member (ANZJOG member)
Dr Christine Sammartino	Observer

Appendix B Overview of the development and review process for this statement

i. Steps in developing and updating this statement

This statement was originally developed in March 2008 and was most recently reviewed in March 2020. The Women's Health Committee carried out the following steps in reviewing this statement:

- Structured clinical questions were developed and agreed upon.
- An updated literature search to answer the clinical questions was undertaken.
- At the February 2020 teleconference, the existing consensus-based recommendations were reviewed and updated (where appropriate) based on the available body of evidence and clinical expertise. Recommendations were graded as set out below in Appendix B part iii)

ii. Grading of recommendations

Each recommendation in this College statement is given an overall grade as per the table below, based on the National Health and Medical Research Council (NHMRC) Levels of Evidence and Grades of Recommendations for Developers of Guidelines.[15] Where no robust evidence was available but there was sufficient consensus within the Women's Health Committee, consensus-based recommendations were developed or existing ones updated and are identifiable as such. Consensus-based recommendations were agreed to by the entire committee. Good Practice Notes are highlighted throughout and provide practical guidance to facilitate implementation. These were also developed through consensus of the entire committee.

Recommendation category		Description
Evidence-based	A	Body of evidence can be trusted to guide practice
	B	Body of evidence can be trusted to guide practice in most situations
	C	Body of evidence provides some support for recommendation(s) but care should be taken in its application
	D	The body of evidence is weak and the recommendation must be applied with caution
Consensus-based		Recommendation based on clinical opinion and expertise as insufficient evidence available
Good Practice Note		Practical advice and information based on clinical opinion and expertise

Appendix C Full Disclaimer

This information is intended to provide general advice to practitioners, and should not be relied on as a substitute for proper assessment with respect to the particular circumstances of each case and the needs of any patient.

This information has been prepared having regard to general circumstances. It is the responsibility of each practitioner to have regard to the particular circumstances of each case. Clinical management should be responsive to the needs of the individual patient and the particular circumstances of each case.

This information has been prepared having regard to the information available at the time of its preparation, and each practitioner should have regard to relevant information, research or material which may have been published or become available subsequently.

Whilst the College endeavours to ensure that information is accurate and current at the time of preparation, it takes no responsibility for matters arising from changed circumstances or information or material that may have become subsequently available.