

Uterine artery embolization in the treatment of symptomatic fibroids – state of the art 2018

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Abstract

Uterine fibroids are considered to be the most common benign tumours in females. The vast majority of these tumours are incidental findings and do not require any treatment. Symptomatic fibroids, with ailments such as abnormal uterine bleeding, dysmenorrhoea, pelvic pain, impaired urination, bowel dysfunction, infertility, and recurrent pregnancy loss, are indicated for medical treatment. Surgery remains a first-line treatment of symptomatic uterine fibroids; however, minimally invasive techniques and pharmacological management have become more available and popular. Among minimally invasive techniques uterine artery embolization (UAE) is the most well-established uterine preserving treatment. UAE was first introduced in obstetrics and gynaecology in 1987 and since then many studies have shown the safety and efficacy of UAE in fibroid treatment with low rates of complications. In this review we present a novel approach to UAE, which reflects the current state of knowledge based on recent clinical trials and long-term post-procedural follow-up.

Key words: uterine artery embolization, fibroids, minimally invasive treatment, fertility.

Introduction

Uterine fibroids are the most commonly detected benign tumours in the female pelvis [1]. This pathology affects around half of women in reproductive age and the occurrence increases up to menopausal age, when it reaches a peak, after which it decreases constantly [2]. The vast majority of fibroids present no symptoms and are incidental findings during routine gynaecological examinations. Asymptomatic uterine fibroids require no medical management beyond observation, whereas symptomatic fibroids are an indication for medical intervention. Available options include surgical, pharmacological and minimally invasive treatment. Uterine artery embolization (UAE) has been the minimally invasive method most frequently used in obstetrics and gynaecology since 1987, when it was first used in haemorrhage treatment [3]. Since then, many studies have investigated the effectiveness, side-effects and follow-up of UAE. During UAE, performed by an interventional radiologist, embolic material is administered to occlude both uterine arteries, which is achieved by introducing a catheter through the femoral artery into the uterine arteries under X-ray supervision. As a result, blood flow is significantly reduced and ischaemia occurs in the tumour, causing necrosis of fibroid cells [4]. The most important benefits of UAE are

uterus preservation and surgery avoidance. Since its introduction in 1995 UAE has been a leading alternative to surgery for symptomatic fibroids management in patients who want to preserve their uterus [5]. Over the years the approach to UAE has changed, while more clinical trials and research papers have been published. Our review will focus on the novel updates on UAE in symptomatic fibroids management. Since its introduction, strong evidence for safety and efficacy of UAE with low rates of complications has been published [6]. In this review we present the current state of knowledge about UAE as a well-established uterine preserving and minimally invasive therapy for symptomatic fibroids.

Literature review

Fertility

The impact of UAE on fertility is a controversial matter and further discussion is still in progress. However, in recent studies focused on fertility preservation and latent desire to conceive, UAE has been presented as a less safe and effective procedure than myomectomy. Moreover, a minimum waiting time of approximately 6 months between fibroid treatment with UAE and

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conception is recommended [7]. Although Mohan *et al.* published a review regarding UAE and fertility in 2013, demonstrating that the pregnancy and preterm delivery rates were comparable to the general population, rates of miscarriage were comparable to those in patients with untreated fibroids [8]. A Cochrane Review from 2014 concluded that there was low-quality evidence to suggest improved fertility outcomes after myomectomy versus UAE [9, 10]. Moreover, Karlsen *et al.* included 17 studies (989 patients) in their review in 2017 with the result of a lower pregnancy rate and higher miscarriage rate after UAE than after myomectomy [11]. In addition, in a recent study Czuczwar *et al.* compared the influence of three fibroid treatment options – supracervical hysterectomy, ulipristal acetate and UAE – on ovarian reserve, with the result that UAE has the greatest impact on ovarian function and should not be offered to patients concerned about their ovarian function [12]. However, in all the above-mentioned studies the need for further randomized studies has been highlighted. According to current guidelines UAE is not recommended for women with the desire for future childbearing [13].

Symptomatic fibroids in postmenopausal patients

Fibroids are hormone-dependent tumours and their growth is dependent on ovarian activity, especially on oestrogen and progesterone levels, while after the menopause most fibroids shrink [2]. A minor group of tumours not only do not regress but also continue to be symptomatic. Hormone replacement therapy and obesity are linked to persistent or new fibroid symptoms in the postmenopausal age [14]. UAE in this age group of patients was not recommended for many years. However, Chrisman *et al.* demonstrated that UAE for the treatment of bulk symptoms in postmenopausal women is safe and effective, resulting in 88.8% to 92% symptom improvement [14]. Fibroid-related bleeding in postmenopausal women may also occur and should be very carefully diagnosed prior to UAE. Underlying malignancy or endometrial hyperplasia should be considered and first-line biopsy is recommended [6]. It is also important to assess the risk of sarcoma, although this may be very challenging preoperatively [15]. UAE may be a treatment option in carefully selected postmenopausal patients with symptomatic uterine fibroids.

Size and location of the fibroid

For many years, UAE was not recommended for patients with fibroids greater than 10 cm, especially those located in the submucosal area and in women with uterine size greater than 24 gestational weeks [16]. These recommendations were based on a few case reports where UAE in patients with large fibroid size and submucosal

location resulted in infection, uterine injury, sepsis, and death [16]. However, recently, several reports have proven the safety and efficacy of UAE in fibroids larger than 10 cm [17]. A novel approach to patients who wish to preserve their uterus and for those expected to be at an increased risk of bleeding postoperatively, due to very large and/or multiple fibroids, difficult to remove fibroids or those in an unfavourable location, demonstrated in the literature is preoperative UAE (PUAE) to reduce bleeding complications [18]. Not only the size of fibroids but also the location was taken into consideration as a relative contraindication for UAE. The presence of pedunculated subserosal fibroids was once associated with the risk of stalk necrosis with fibroid detachment from the uterus, resulting in bowel or peritoneal inflammation requiring surgical intervention [19]. Based on evidence published in three studies, which demonstrated that UAE can be safe and effective for patients with pedunculated subserosal fibroids with different stalk diameter, ranging from 1.6 to 5.2 cm, this localization of fibroids is no longer a contraindication for UAE [20-22]. However, Lacayo *et al.* demonstrated that regardless of the embolic material used, pedunculated serosal fibroids were less likely to infarct than transmural tumours [23]. Thus, while the embolization of pedunculated fibroids may be safe, the chance of successful treatment may be lower compared with fibroids in other uterine locations [6].

Intrauterine device

During the first week after UAE, approximately 10% to 15% of patients experienced the symptoms of a post-embolization syndrome. Post-embolization pain, occurring in the first hours after surgery, is caused by the release of products of the ischaemic fibroid tissue breakdown and requires intense analgesic treatment. Those conditions should be differentiated from post-procedural infection [24]. Infection is potentially the most serious complication after UAE [25]. The presence of an intrauterine device (IUD) may be considered a risk factor for post-procedural infection and it was recommended before to remove the IUD prior to UAE [6]. The combination of a foreign body within the uterine cavity and necrotic fibroid tissue following UAE was thought to increase the rate of infection [26]. However, in large follow-up studies, the risk of pelvic inflammatory disease attributed to the IUD is less than 1 in 1,300 [6]. Smeets *et al.* in a study of 20 women with IUDs undergoing UAE did not demonstrate any infectious complications [26]. The presence of an IUD should therefore not be a contraindication to UAE.

Adenomyosis

Adenomyosis is defined as presence of endometrial tissue within the myometrium. The condition can occur

solitarily but also in combination with endometriosis or uterine fibroids [27]. It is typically found in women in reproductive age. The symptoms are nonspecific, which makes it more difficult to diagnose. The spectrum of symptoms includes pelvic pain, dysmenorrhoea, menorrhagia and bulk-related symptoms [28]. The treatment is conservative (e.g. levonorgestrel-releasing intrauterine device – LNG-IUD) or surgical. Although adenomyosis was considered to be a contraindication for UAE [29], nowadays UAE may be an alternative treatment option in symptomatic patients. It seems that UAE might be combined with LNG-IUD, since there is no necessity for removal of the device before UAE [7]. In a recent systematic review and meta-analysis Annefleury *et al.* evaluated the effect of UAE on symptomatic pure adenomyosis and adenomyosis combined with fibroids in short- and long-term follow up. The results from the study show positive short-term and long-term outcomes of UAE treatment in both groups [30]. The researchers reported improvement of clinical symptoms in 83.1% of the patients (872 of 1,049) in the reviewed studies. Their conclusion was that combined adenomyosis seems to respond better to UAE than isolated adenomyosis. UAE may be a valuable treatment option alternative to hysterectomy, but further studies are required [30].

Conclusions

Since UAE was first described in 1995 as an alternative to hysterectomy for the treatment of symptomatic uterine fibroids, a large number of studies including several randomized controlled trials have established UAE as a valuable treatment method. The safety and efficacy of UAE have been well grounded. Over those years indications and contraindications have been modified based on novel research findings and longer follow-up. According to data presented in this article the group of patients potentially qualified for UAE has broadened, but it should be stressed that appropriate qualification for UAE is an individual matter and it is paramount for high clinical efficacy and prevention of complications after the procedure.

Disclosure

The author reports no conflict of interest.

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