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| <b>4.01.11</b>               | <b>Occlusion of Uterine Arteries Using Transcatheter Embolization</b> |                        |                 |
| <b>Original Policy Date:</b> | February 25, 1998   | <b>Effective Date:</b> | October 1, 2019 |
| <b>Section:</b>              | 4.0 OB/Gyn/Reproduction   | <b>Page:</b>           | Page 1 of 22    |

## Policy Statement

Transcatheter embolization of uterine arteries may be considered **medically necessary** as a treatment of **either** of the following:

- Uterine fibroids
- Postpartum uterine hemorrhage

One repeat transcatheter embolization of uterine arteries to treat persistent symptoms of uterine fibroids after an initial uterine artery embolization may be considered **medically necessary** (see Policy Guidelines section).

Transcatheter embolization is considered **investigational** for the management of all other indications, including **any** of the following:

- Adenomyosis
- Cervical ectopic pregnancy
- Uterine arteriovenous malformation

## Policy Guidelines

### Patient Selection Criteria

#### Initial Procedure

There are no specific criteria for uterine artery embolization regarding the size, location, or multiplicity of fibroid tumors. The American College of Obstetricians and Gynecologists has suggested the following general criteria for treatment of fibroid tumors:

- Asymptomatic fibroids of such size that they are palpable abdominally and are a concern to the patient
- Excessive uterine bleeding as evidenced by either profuse bleeding lasting more than 8 days, or anemia due to acute or chronic blood loss
- Pelvic discomfort caused by myomata, either acute severe pain, chronic lower abdominal pain, or low back pressure or bladder pressure with a urinary frequency not due to urinary tract infection

#### Repeat Procedure

One repeat uterine artery embolization may be performed when there is documentation of continued symptoms such as bleeding or pain. Repeat procedures may be most appropriate when there are persistent symptoms in combination with findings on imaging of an incomplete initial procedure, as evidenced by continued blood flow to the treated regions. Limited data from case series have suggested a high rate of success following repeat procedures for this purpose, with most patients reporting relief of symptoms.

#### Coding

There are nonspecific embolization codes for this procedure:

- **37243:** Vascular embolization or occlusion, inclusive of all radiological supervision and interpretation, intraprocedural roadmapping, and imaging guidance necessary to complete the intervention; for tumors, organ ischemia, or infarction
- **37244:** Vascular embolization or occlusion, inclusive of all radiological supervision and interpretation, intraprocedural roadmapping, and imaging guidance necessary to complete the intervention; for arterial or venous hemorrhage or lymphatic extravasation

## Description

Transcatheter uterine artery embolization (UAE) is a minimally invasive technique that involves the injection of small particles, gelfoam, coils, or glue into the uterine arteries to block the blood supply to the uterus and uterine fibroids. It potentially serves as an alternative to hysterectomy. UAE has also been used to treat postpartum hemorrhage, cervical ectopic pregnancy, uterine arteriovenous malformations, and adenomyosis.

## Related Policies

- Laparoscopic and Percutaneous Techniques for the Myolysis of Uterine Fibroids
- Magnetic Resonance-Guided Focused Ultrasound

## Benefit Application

Benefit determinations should be based in all cases on the applicable contract language. To the extent there are any conflicts between these guidelines and the contract language, the contract language will control. Please refer to the member's contract benefits in effect at the time of service to determine coverage or non-coverage of these services as it applies to an individual member.

Some state or federal mandates (e.g., Federal Employee Program [FEP]) prohibits plans from denying Food and Drug Administration (FDA)-approved technologies as investigational. In these instances, plans may have to consider the coverage eligibility of FDA-approved technologies on the basis of medical necessity alone.

## Regulatory Status

In April 2000, Embosphere® Microspheres (Merit Medical, formerly BioSphere Medical) was cleared for marketing by the U.S. Food and Drug Administration (FDA) through the 510(k) process for hypervascularized tumors and AVMs. In 2002, this product was cleared for marketing specifically for use in uterine fibroid embolization. Since then, several other devices have been cleared for marketing. In 2003, Contour® Emboli PVA (Boston Scientific) was cleared for marketing by the FDA through the 510(k) process for the embolization of peripheral hypervascular tumors and peripheral AVMs. In March 2004, the Contour SE™ (Boston Scientific) was cleared for marketing by the FDA through the 510(k) process for the treatment of uterine fibroids. In 2008, Polyvinyl Alcohol Foam Embolization Particles (Cook Inc.) was cleared for marketing by the FDA through the 510(k) process for use in uterine fibroid embolization. In 2016, Bead Block™ microspheres (Biocompatibles UK) were cleared for marketing by the FDA for embolization of uterine fibroids and AVMs. FDA product code: NAJ.

## Rationale

### Background

#### Uterine Artery Embolization

There is interest in techniques that directly devascularize the uterine fibroid by interrupting the uterine arteries. One technique, uterine artery embolization, involves selective catheterization of the uterine arteries with an injection of embolization material. Uterine artery embolization has also been used to control bleeding in situations such as severe postpartum hemorrhage, cervical ectopic pregnancy, bleeding uterine arteriovenous malformations (AVMs), and adenomyosis.

### Literature Review

This review was informed in part by a Blue Cross Blue Shield Association Technology Evaluation Center (TEC) Assessment (2002).<sup>1</sup>

Evidence reviews assess the clinical evidence to determine whether the use of technology improves the net health outcome. Broadly defined, health outcomes are the length of life, quality of life (QOL), and ability to function—including benefits and harms. Every clinical condition has specific outcomes that are important to patients and managing the course of that condition. Validated outcome measures are necessary to ascertain whether a condition improves or worsens; and whether the magnitude of that change is clinically significant. The net health outcome is a balance of benefits and harms.

To assess whether the evidence is sufficient to draw conclusions about the net health outcome of technology, two domains are examined: the relevance, and quality and credibility. To be relevant, studies must represent one or more intended clinical use of the technology in the intended population and compare an effective and appropriate alternative at a comparable intensity. For some conditions, the alternative will be supportive care or surveillance. The quality and credibility of the evidence depend on study design and conduct, minimizing bias and confounding that can generate incorrect findings. The randomized controlled trial (RCT) is preferred to assess efficacy; however, in some circumstances, nonrandomized studies may be adequate. RCTs are rarely large enough or long enough to capture less common adverse events and long-term effects. Other types of studies can be used for these purposes and to assess generalizability to broader clinical populations and settings of clinical practice.

## **Uterine Fibroids**

### **Clinical Context and Therapy Purpose**

The purpose of transcatheter uterine artery embolization (UAE) in patients who have uterine fibroids is to provide a treatment option that is an alternative to or an improvement on existing therapies.

The question addressed in this evidence review is: Does transcatheter UAE improve the net health outcomes in women with uterine fibroids?

The following PICO's were used to select literature to inform this review.

### **Patients**

The relevant populations of interest are women with uterine fibroids.

Treatment for uterine fibroids is typically recommended when accompanied by menorrhagia, pelvic pain, or urinary symptoms (i.e., frequency), or when the fibroids are suspected to cause infertility. Treatment options include medical therapy with gonadotropin agonists or progestins or various types of surgical therapy. Hysterectomy is considered the definitive surgical treatment for those who no longer want to maintain fertility. Various types of myomectomy (the removal of fibroids with retention of the uterus) are recommended to maintain fertility. Hysteroscopic myomectomy involves removal of submucosal fibroids using a resectoscope or a laser. Subserosal fibroids can be removed via an open abdominal or laparoscopic approach. Laparoscopic laser coagulation of uterine fibroids is a unique approach in which the fibroid is not physically removed; instead, multiple (up to 75) laparoscopic laser punctures of the uterine fibroid are performed to devascularize the fibroid and induce atrophy.

### **Interventions**

The intervention of interest is transcatheter UAE, which is a minimally invasive technique in which a catheter is used to inject small embolic agents into the uterine arteries and block the blood supply. With the blood supply to uterine fibroids and the uterus blocked, the fibroids will shrink. Transcatheter UAE is administered in a tertiary care setting.

## Comparators

The following therapies, most of which are more invasive, are currently being used to make decisions about uterine fibroids: hysterectomy, myomectomy, and other uterine fibroid treatments, most of which are conducted in a tertiary care setting.

## Outcomes

The general outcomes of interest include patient satisfaction (QOL, in years), live birth rates (when the comparison is a uterine-sparing procedure), uterine volume reduction (in months), fibroid volume reduction (in months), and reintervention rates (in years). The following table describes the questionnaires used to measure the QOL.

**Table 1. Outcomes of Interest for Individuals with Uterine Fibroids Treated With UAE**

| Measure   | Outcome Evaluated | Description   | Follow-up Timing                 |
|---|-------------------|---|----------------------------------|
| Defecation Distress Inventory   | Quality of life   | Scores for constipation, fecal incontinence, painful defecation, and flatus incontinence in patients with and without enterocele                              | Up to 5 years                    |
| 36-Item Short-Form Health Survey, physical and mental component summary | Quality of life   | A survey of 8 health concepts that rely on patient self-reporting. All items are scored so that a high score indicates a more favorable health state (0-100). | Up to 5 years <sup>2,3,4</sup> . |

UAE: uterine artery embolization.

## Study Selection Criteria

Methodologically credible studies were selected using the following principles:

- To assess efficacy outcomes, comparative controlled prospective trials were sought, with a preference for RCTs.
- In the absence of such trials, comparative observational studies were sought, with a preference for prospective studies.
- To assess long-term outcomes and adverse effects, single-arm studies that capture longer periods of follow-up and/or larger populations were sought.
- Studies with duplicative or overlapping populations were excluded.

## Initial UAE Procedure for Uterine Fibroids

A number of RCTs evaluating UAE for the treatment of uterine fibroids and several systematic reviews of these RCTs have been published. RCTs have compared UAE with hysterectomy, myomectomy, laparoscopic occlusion of uterine arteries, and focused ultrasound.

## Systematic Reviews

A Cochrane review by Gupta et al (2014) included 7 RCTs comparing UAE with other surgical interventions in women with symptomatic uterine fibroids.<sup>5</sup> Four of the RCTs excluded women who desired pregnancy in the future. The comparator intervention was hysterectomy in three trials, hysterectomy or myomectomy in two trials, and myomectomy in two trials. Reviewers' primary outcomes were patient satisfaction and live birth rates (the latter analysis limited to studies where the comparison intervention was a uterine-sparing procedure). Pooled analyses did not find statistically significant differences in patient satisfaction with UAE or other interventions after 2 years (6 trials; odds ratio [OR], 0.94; 95% confidence interval [CI], 0.59 to 1.48) or 5 years (2 trials; OR=0.90; 95% CI, 0.45 to 1.80). A single study reported live birth rates, so a meta-analysis was not possible. UAE was associated with a higher rate of minor complications at 1 year (6 trials; OR=1.99; 95% CI, 1.41 to 2.81), and there was no statistically significant difference between groups in the rate of major complications. Moreover, the UAE group was significantly less likely to require a blood transfusion than the surgery group (2 trials; OR=0.07; 95% CI, 0.01 to 0.52). The rate of further surgical interventions within 2 years was significantly increased in the UAE group (6 trials; OR=3.72; 95% CI, 2.28 to 6.04).

In a systematic review and meta-analysis, Das et al (2014) identified 10 studies comparing the efficacy of 1 embolic agent used in UAE with another intervention or comparing 2 embolic agents.<sup>6</sup> Five studies were RCTs, and five were nonrandomized controlled trials. Embosphere microspheres were used in all RCTs. In a pooled analysis of data from two studies comparing microspheres with spherical polyvinyl alcohol for the treatment of uterine fibroids, there were no statistically significant between-group differences in outcomes (uterine volume reduction, dominant fibroid volume reduction). Data from other studies were not pooled, and qualitative analysis of study findings did not suggest that any agent was superior or inferior to any other agent.

A systematic review and meta-analysis by Martin et al (2013) assessed complications and reintervention rates following UAE and surgery for symptomatic uterine fibroids.<sup>7</sup> Surgery was not defined in this meta-analysis, so it is unclear whether myomectomies were included with hysterectomies. Outcomes for UAE and surgery were stratified by study design (RCTs, nonrandomized studies, case series). Eight RCTs comparing UAE with a surgical intervention were included, for a total of 350 patients undergoing UAE and 346 patients undergoing surgery. Among the UAE cases in the RCTs, the most common complications were discharge and fever (4%), postembolization syndrome (2.9%), pain (2.9%), and groin complications (2.9%). The most common complications among patients undergoing surgery were urinary stress incontinence (3.8%), pressure symptoms (2.9%), and menorrhagia (2.6%). Three trials presented reintervention data and, in a meta-analysis of these studies, there was a significantly higher risk of reintervention after UAE than after surgery, but a wide CI indicates imprecision in the risk estimate (OR=6.04; 95% CI, 2.0 to 18.1).

Van der Kooij et al (2011) published a systematic review and meta-analysis of RCTs comparing UAE with surgery (hysterectomy or myomectomy) for treating symptomatic uterine fibroids and presenting up to 5 years of follow-up data.<sup>2</sup> Reviewers identified 11 articles reporting on 5 RCTs. The overall intraprocedural and early postprocedural complication rates were similar with both procedures. However, hospital length of stay, need for blood transfusion, and febrile morbidity was significantly lower in the UAE group than in the surgery group. At 12 months, a pooled analysis of 2 studies found a significantly higher reintervention rate in the UAE group than in the surgery group (OR=5.78; 95% CI, 2.14 to 15.58). The reintervention rate was significantly higher in the UAE group at 5 years, based on a pooled analysis of 2 trials (OR=5.41; 95% CI, 2.48 to 11.81). Pooled analyses of QOL variables at 12 months found no significant differences between groups. Results were similar after five years.

### **Randomized Controlled Trials**

#### **UAE vs Hysterectomy or Myomectomy**

The multicenter Randomized Trial of Embolization vs Surgical Treatment for Fibroids assigned patients 2:1 to UAE (n=106) or surgery (n=43 hysterectomies, n=8 myomectomies).<sup>3</sup> The UAE group had lower postoperative pain (3.0 vs 4.6, respectively) and faster recovery (e.g., the median length of hospitalization, one day vs five days, respectively). Of seven identified pregnancies in the UAE group, two resulted in successful live births. Five-year follow-up data from the Randomized Trial of Embolization vs Surgical Treatment for Fibroids trial were published by Moss et al (2011).<sup>8</sup> A total of 144 (92%) of the 157 randomized patients were included in the 5-year analysis. QOL and symptom scores were similar in both groups at 5 years: mean symptom score was 4.5 in the UAE group and 4.8 in the surgery group (score range, 15 [markedly worse] to 5 [markedly better]). At 5-year follow-up, 27 (25%) of 106 in the UAE group and 2 (4%) of 51 in the surgery group had received an additional intervention for ongoing or recurrent symptoms. The total rate of further intervention for symptoms or adverse events over the 5-year period was 32% in the UAE group and 4% after surgery. In the UAE group, there were 3 procedural failures, 8 repeat UAEs, and 18 hysterectomies. Note that a woman had both a repeat UAE and a hysterectomy, and two women were not embolized after randomization and subsequently underwent surgery.

The EMbolization versus hysterectoMY trial from the Netherlands included 177 women with uterine fibroids and heavy menstrual bleeding who were scheduled to undergo a hysterectomy.<sup>9,10</sup> They were randomized to UAE (n=88) or hysterectomy (n=89). By the 2-year follow-up, 19 (23%) of the 81 women who received UAE had undergone a hysterectomy. An analysis of health-related QOL outcomes at two years found similar improvement in both groups. The Defecation Distress Inventory score improved significantly only in the UAE group starting at six months. A report of 5-year outcomes data from the EMbolization versus hysterectoMY trial was published by van der Kooij et al (2010).<sup>4</sup> At 5 years, 70 (79%) of 89 patients originally randomized to the hysterectomy group and 75 (85%) of 88 patients in the UAE group completed questionnaires. In an intention-to-treat analysis, 23 (28.4%) of 81 patients who had received UAE underwent a hysterectomy during the 5 years. Including patients who had subsequent hysterectomies, 58 (71.6%) of 81 patients in the UAE group no longer had menorrhagia. There were no significant differences between groups in health-related QOL at 5 years, as assessed by the Physical and Mental Component Summary scores of the 36-Item Short-Form Health Survey. Ten-year outcomes were reported by de Bruijn et al (2016).<sup>11</sup> Completed questionnaires were available for 131 (75%) of 177 randomized patients at 10 years. An additional 5 hysterectomies were performed between the 5- and 10-year follow-ups, for a total of 28 (35%) hysterectomies in the UAE group. At ten years, there were no statistically significant differences between groups in health-related QOL or in urinary and defecation function.

Findings of the Fibroids of the Uterus: Myomectomy versus Embolization trial from the U.K. were published by Manyonda et al (2012).<sup>12</sup> The investigators randomized women with symptomatic fibroids to UAE (n=82) or myomectomy (n=81). Mean hospital stay was significantly shorter after UAE (two days) than after surgery (four days;  $p<0.001$ ). There were no significant differences in minor or major complications. A total of 120 (74%) of 163 women were available for analysis of the primary outcome measure (QOL). There were no significant differences between groups in change in QOL scores from baseline to one year. Nine (11%) patients in the UAE group required additional intervention (6 hysterectomies, 2 myomectomies, 1 repeat embolization) and 3 (4%) patients in the myomectomy group later underwent a hysterectomy.

#### **UAE vs Laparoscopic Occlusion of Uterine Arteries**

An RCT by Hald et al (2007) in Norway evaluated clinical outcomes in 66 premenopausal women (mean age, 43 years) with symptomatic uterine fibroids who were assigned to laparoscopic occlusion of uterine arteries or UAE.<sup>13</sup> Women who wanted to bear children in the future, had a large uterus, had undergone multiple open abdominal surgeries, and who had bleeding disorders were excluded. The primary outcome was a reduction in blood loss at six months postintervention, as measured by a pictorial blood loss assessment chart. Fifty-eight women underwent treatment, 29 in each group. The proportion of women who had a reduction in blood loss after 6 months did not differ between the treatment groups (52% after UAE vs 53% after laparoscopy;  $p=0.96$ ). Follow-up data were reported by Hald et al (2009) at a median of 48 months posttreatment (range, 8-73 months).<sup>14</sup> The cumulative clinical failure and recurrence rate was significantly lower in the UAE group (17% [n=5]) than in the laparoscopy group (48% [n=17];  $p=0.02$ ). Moreover, fewer patients in the UAE group (7% [n=2]) had a hysterectomy than in the laparoscopy group (28% [n=8];  $p=0.41$ ). The authors concluded that UAE is superior to laparoscopic occlusion of uterine arteries for treatment of uterine fibroids.

#### **UAE vs Focused Ultrasound**

Barnard et al (2017) published an RCT and a cohort study comparing the use of UAE with magnetic resonance imaging-guided focused ultrasound surgery (MRgFUS) for the treatment of uterine fibroids.<sup>15</sup> Premenopausal women with symptomatic uterine fibroids were randomized to MRgFUS (n=27) or UAE (n=22). Women who declined randomization were enrolled in a nonrandomized cohort study; 43 underwent MRgFUS, and 40 underwent UAE. The outcome of interest was recovery during the first six weeks postprocedure, captured in symptom diaries that included information on return to work, return to normal activities, medication use, symptoms, and adverse events. Separate multivariate analyses of the RCT and the cohort populations found similar conclusions: opioid use was significantly higher in the UAE group, and length of time

to the first day fully back to work and the first day back to normal activities were also significantly longer for patients treated with UAE. Treatment time was significantly longer in the MRgFUS group.

### **Section Summary: Initial UAE Procedures for Uterine Fibroids**

Most of the current evidence, including a number of RCTs and systematic reviews, has compared UAE with surgery (hysterectomy or myomectomy) for treating uterine fibroids. A Cochrane review found similar levels of patient satisfaction after UAE and surgery. A potential benefit of UAE over hysterectomy is that, depending on the location of the fibroids, the uterus and fertility may be preserved. Other benefits of UAE over hysterectomy and/or myomectomy include lower blood transfusion rates and lower complication rates. However, studies with long-term follow-up have shown that patients undergoing UAE have higher reintervention rates. Single RCTs have compared UAE with laparoscopic occlusion and MRgFUS. UAE had higher clinical success rates and lower reintervention rates than laparoscopic occlusion. Recovery was longer and opioid use higher among patients undergoing UAE compared with MRgFUS. Additional research comparing other uterus-sparing procedures with UAE are needed. The available evidence from RCTs does not suggest that one embolization agent is superior to another.

### **Repeat UAE Procedures for Recurrent or Persistent Uterine Fibroid Symptoms**

#### **Clinical Context and Therapy Purpose**

Treatment for uterine fibroids is typically recommended when accompanied by menorrhagia, pelvic pain, or urinary symptoms (i.e., frequency), or when the fibroids are suspected to cause infertility. Treatment options include medical therapy with gonadotropin agonists or progestins or various types of surgical therapy. Hysterectomy is considered the definitive surgical treatment for those who no longer want to maintain fertility. Various types of myomectomy (the removal of fibroids with retention of the uterus) are recommended to maintain fertility. Hysteroscopic myomectomy involves removal of submucosal fibroids using a resectoscope or a laser. Subserosal fibroids can be removed via an open abdominal or laparoscopic approach. Laparoscopic laser coagulation of uterine fibroids is a unique approach in which the fibroid is not physically removed; instead, multiple (up to 75) laparoscopic laser punctures of the uterine fibroid are performed to devascularize the fibroid and induce atrophy.

The purpose of transcatheter UAE in patients who have persistent uterine fibroids despite prior UAE is to provide a treatment option that is an alternative to or an improvement on existing therapies.

The question addressed in this evidence review is: Does transcatheter UAE improve the net health outcomes in women with persistent uterine fibroids despite prior UAE?

The following PICOs were used to select literature to inform this review.

#### **Patients**

The relevant populations of interest are women with uterine fibroids who have undergone prior UAE.

#### **Interventions**

The intervention of interest is transcatheter UAE, which is a minimally invasive technique in which a catheter is used to inject small embolic agents into the uterine arteries and block the blood supply. With the blood supply to uterine fibroids and the uterus blocked, the fibroids will shrink. Transcatheter UAE is administered by a physician in a tertiary care setting.

#### **Comparators**

The following therapies, most of which are more invasive, are currently being used to make decisions about persistent uterine fibroids despite prior UAE: hysterectomy and myomectomy, both of which are administered by a physician in a tertiary care setting.

## Outcomes

The general outcome of interest includes symptom control, with follow-up from months to years.

## Study Selection Criteria

Methodologically credible studies were selected using the following principles:

- To assess efficacy outcomes, comparative controlled prospective trials were sought, with a preference for RCTs.
- In the absence of such trials, comparative observational studies were sought, with a preference for prospective studies.
- To assess long-term outcomes and adverse effects, single-arm studies that capture longer periods of follow-up and/or larger populations were sought.
- Studies with duplicative or overlapping populations were excluded.

## Repeat UAE

No RCTs focusing on repeat UAE were identified; there are published case series. McLucas and Reed (2009) conducted a chart review of 1058 women who had undergone an initial bilateral UAE at several U.S. centers.<sup>16</sup> Forty-two (4%) patients had documented persistent symptoms, and they were offered a second bilateral UAE. Thirty-nine patients had repeat procedures, and 34 (87%) of them completed a follow-up questionnaire at least 6 months postembolization. Before the second UAE procedure, 27 (79%) of the 34 women reported severe bleeding, with only 2 (6%) women reporting severe bleeding postprocedure. Similarly, the number of women with severe pain decreased from 20 (59%) to 2 (6%), and with severe pressure decreased from 18 (53%) to 2 (6%). Four women experienced severe levels of one or more symptoms after the second UAE.

Yousefi et al (2006) reported on 24 patients who underwent repeat embolization for recurrent or persistent symptoms 6 to 66 months after the initial UAE.<sup>17</sup> The most common symptoms were pressure and/or bulk symptoms (n=15), recurrent heavy bleeding (n=12), and pelvic pain or cramping (n=7). Follow-up data were available on 21 (87.5%) of 24 after the second UAE; 19 (90%) reported symptom control.

## Pregnancy Outcomes With Uterine Fibroids

Mara et al (2008) conducted a controlled trial that randomized 121 women with uterine fibroids who desired future pregnancies to UAE or myomectomy.<sup>18</sup> Participants were followed for a mean of 25 months; they were advised to wait for at least 6 months postprocedure before attempting to conceive. At final follow-up, 13 (50%) of 26 women in the UAE group who tried to conceive became pregnant compared with 31 (76%) of 40 in the myomectomy group; the difference between groups was not statistically significant. Among women in the UAE group who became pregnant, the spontaneous abortion rate was 64%, and the live birth rate was 19%. In the myomectomy group, the spontaneous abortion rate was 23%, and the live birth rate was 48%.

## Section Summary: Repeat UAE Procedures for Recurrent or Persistent Uterine Fibroid Symptoms

There is a lack of RCTs on repeat UAE for the treatment of symptoms associated with recurrent uterine fibroids. However, there are data from case series showing high rates of success after the second UAE for recurrent or persistent symptoms.

## Postpartum Uterine Hemorrhage

### Clinical Context and Therapy Purpose

The purpose of transcatheter UAE in patients who have postpartum uterine hemorrhage is to provide a treatment option that is an alternative to or an improvement on existing therapies. The question addressed in this evidence review is: Does transcatheter UAE improve the net health outcomes in women postpartum uterine hemorrhage?

The following PICOs were used to select literature to inform this review.



## Patients

The relevant populations of interest are women with postpartum uterine hemorrhage.

## Interventions

The intervention of interest is transcatheter UAE, which is a minimally invasive technique in which a catheter is used to inject small embolic agents into the uterine arteries and block the blood supply. UAE is performed by a physician in a tertiary care setting.

## Comparators

The following therapies, most of which are more invasive, are currently being used to make decisions about postpartum uterine hemorrhage: hysterectomy or uterine-sparing surgery, which are performed by a physician in a tertiary care setting.

## Outcomes

The general outcomes of interest include control of bleeding (post-procedure) and live births. No RCTs or other comparative studies evaluating UAE for treating postpartum hemorrhage were identified. Several systematic reviews of the literature have been published.

## Study Selection Criteria

Methodologically credible studies were selected using the following principles:

- To assess efficacy outcomes, comparative controlled prospective trials were sought, with a preference for RCTs.
- In the absence of such trials, comparative observational studies were sought, with a preference for prospective studies.
- To assess long-term outcomes and adverse effects, single-arm studies that capture longer periods of follow-up and/or larger populations were sought.
- Studies with duplicative or overlapping populations were excluded.

## Systematic Reviews

Sathe et al (2016) reported that rates of successful bleeding control with UAE in uncontrolled studies ranged from 58% to 98%, with a total of 1251 (87%) of 1435 patients in 15 studies achieving successful control of bleeding.<sup>19</sup>

Previously, Rath et al (2012) published a systematic review of the literature on second-line treatment of postpartum hemorrhage.<sup>20</sup> Success rates of UAE for postpartum hemorrhage reported in uncontrolled studies ranged from 70% to 100% and from 60% to 83% when the hemorrhage was associated with placenta accreta.

## Case Series

Among the representative, larger case series is the retrospective evaluation by Kim et al (2013) who analyzed data on 121 women with postpartum hemorrhage, 60 women of whom underwent UAE and 61 of whom underwent a cesarean hysterectomy at a single-center in Korea.<sup>21</sup> The clinical success rate for UAE (which was not explicitly defined) was reported as 96%. Eleven patients treated with UAE experienced transient fever after the procedure, and there was a case of ovarian failure. Two patients were subsequently treated with cesarean hysterectomy. Among the 61 patients at the same center who underwent a cesarean hysterectomy, the success rate was 93%. Four patients in this group underwent UAE immediately following cesarean hysterectomy due to arterial hemorrhage at extrauterine sites (two cases) and bleeding from uterine collateral vessels (two cases).

Ganguli et al (2011) evaluated data on 66 women who underwent UAE for the treatment of postpartum hemorrhage.<sup>22</sup> The clinical success rate (defined as obviation of hysterectomy) was 95%. Three (5%) of 66 women had a subsequent hysterectomy. In addition to the three clinical failures, there were three (5%) major complications after UAE: one case each of lower-extremity deep vein thrombosis, postprocedural pancreatitis, and presumed endometritis. Nine pregnancies after UAE were identified; there were two spontaneous abortions and seven viable gestations.

Kirby et al (2009) retrospectively analyzed data from 43 women who underwent UAE for primary postpartum hemorrhage.<sup>23</sup> Clinical success was defined as a cessation of bleeding without the need for repeat embolization, laparotomy, or hysterectomy and without mortality. Eight (19%) of 43 women had a hysterectomy before UAE in an attempt to stop bleeding. Of the remaining 35 women, clinical success was achieved in 29 (83%) women. Considering the sample as a whole, the clinical success rate was 29 (67%) of 43. Complications among women who had UAE without a previous hysterectomy included one case each of groin hematoma, inadvertent perforation of the left obturator artery during UAE, bleeding necrotic fibroid tumor, and symptoms consistent with endometritis.

### **Pregnancy Outcomes With Postpartum Hemorrhage**

Doumouchtsis et al (2014) identified 17 studies (total n=675 participants) reporting on fertility outcomes after UAE for postpartum hemorrhage.<sup>24</sup> To be selected, studies had to report on five or more cases. None identified was an RCT. A total of 168 (25%) of the 675 patients wanted pregnancy following UAE and 126 (75%) of the 168 women who desired pregnancy conceived. There were 136 term live births and 30 cases of pregnancy loss (ectopic pregnancy, miscarriage, elective abortion).

Mohan et al (2013) identified 21 studies reporting pregnancy outcomes and/or pregnancy complications after UAE for the treatment of uterine fibroids or postpartum hemorrhage.<sup>25</sup> Most studies included in the systematic review were observational and had no or inadequate controls. Reviewers reported that the cumulative pregnancy and miscarriage rates among women trying to conceive following UAE for uterine fibroids were 59% and 28%, respectively, and the cumulative live birth rate was 65%. The term delivery rate was 61%. In the studies on UAE for postpartum hemorrhage, the cumulative pregnancy rate, based on a small number of pregnancies, was 87.2%. Rates of miscarriage and live births were not reported following UAE for postpartum hemorrhage.

### **Section Summary: Postpartum Uterine Hemorrhage**

There is a lack of RCTs or other controlled studies assessing the UAE for the treatment of postpartum hemorrhage. Case series involving over 1400 patients have shown a high rate of success stopping the bleeding. Without treatment, there is a high likelihood of significant ongoing hemorrhage and maternal mortality. Given that this is an emergent, often clinically complex situation that can result in maternal mortality, it may not be practical to conduct RCTs and positive case series data may suffice.

### **Cervical Ectopic Pregnancy**

#### **Clinical Context and Therapy Purpose**

Ectopic pregnancies account for up to 2% of pregnancies and are the leading cause of first-trimester maternal mortality. Patients present with pelvic pain and vaginal bleeding. First-line treatment for patients with minimal symptoms is systemic methotrexate. In patients with high  $\beta$ -human chorionic gonadotrophin, response to methotrexate may not be adequate, and the patient is susceptible to complications such as hemorrhaging, resulting in the need for a hysterectomy.

The purpose of transcatheter UAE in patients who have cervical ectopic pregnancy is to provide a treatment option that is an alternative to or an improvement on existing therapies.

The question addressed in this evidence review is: Does transcatheter UAE improve the net health outcomes in women with cervical ectopic pregnancy?

The following PICO's were used to select literature to inform this review.

### **Patients**

The relevant populations of interest are women with cervical ectopic pregnancy.

### Interventions

The intervention of interest is transcatheter UAE, which is a minimally invasive technique in which a catheter is used to inject small embolic agents into the uterine arteries and block the blood supply. UAE is performed in a tertiary care setting.

### Comparators

The following therapies, most of which are more invasive, are currently being used to make decisions about cervical ectopic pregnancy: medication (e.g., methotrexate) or surgery. Surgery is performed in a tertiary care setting.

### Outcomes

The general outcomes of interest include clinical and technical success (post-procedure) and stopping recurrent bleeding (up to six months).<sup>26</sup>

### Study Selection Criteria

Methodologically credible studies were selected using the following principles:

- To assess efficacy outcomes, comparative controlled prospective trials were sought, with a preference for RCTs.
- In the absence of such trials, comparative observational studies were sought, with a preference for prospective studies.
- To assess long-term outcomes and adverse effects, single-arm studies that capture longer periods of follow-up and/or larger populations were sought.
- Studies with duplicative or overlapping populations were excluded.

### Retrospective Studies and Case Series

No RCTs or other comparative studies evaluating the UAE for treating cervical ectopic pregnancy were identified. The published literature consists of small case series. Sample sizes range from 2 to 20 patients, and most studies had fewer than 10 patients.

Kwon et al (2017) retrospectively reviewed the charts of 13 women who had ectopic pregnancies that were refractory to systemic methotrexate who were then treated with UAE.<sup>26</sup> Locations of the ectopic implantation were: cesarean scar (n=6), cervix (n=5), fallopian tube (n=1), and uterine cornua (n=1). Outcomes were a technical success, clinical success, and complications. Results were reported for all patients, regardless of the ectopic implantation site. Mean gestational age at the time of diagnosis was 8.5 weeks (range, 3-14 weeks). Median follow-up was 25 weeks (range, 4-85 weeks). Technical success was 100%. Clinical success was achieved in 10 (77%) patients. Three patients experienced recurrent vaginal bleeding (two instances of which occurred in patients who had cervical ectopic pregnancies) and underwent repeat embolizations. The uteri of all 13 patients were preserved.

Hu et al (2016) retrospectively reviewed the charts of 19 women who had cervical pregnancies and were treated with UAE followed by curettage.<sup>27</sup> The median gestational age of the fetuses at the time of UAE was 7.4 weeks. One procedure was deemed an emergency due to profuse bleeding; the remaining 18 were not. There were no reports of further vaginal bleeding following UAE. None of the patients underwent a hysterectomy due to cervical pregnancy. Nine patients were followed for up to 39 months. Eight of the nine resumed normal menstruation. Only one attempted to conceive, and she had an uncomplicated pregnancy and a vaginal delivery.

A prospective series was conducted in China by Xiaolin et al (2010).<sup>28</sup> Patients received methotrexate injections before, during, and after the UAE procedure. Median follow-up was 12 months (range, 1-50 months). Two (10%) of 20 patients had recurrent vaginal bleeding; the other 18 had no significant bleeding after UAE. Five (25%) patients had an additional curettage procedure due to bleeding and/or high levels of  $\beta$ -human chorionic gonadotropin. The uterus was preserved in all patients, and normal menses resumed after two to four months. Eight (50%)

of 16 women who attempted to conceive achieved a normal pregnancy within 1 year. There were two miscarriages and six live births at term.

### **Section Summary: Cervical Ectopic Pregnancy**

Cervical ectopic pregnancy is an emergent, rare, and clinically complex situation that may preclude gathering controlled data for evidence. However, because there are only a few case series available, additional case series are needed to inform a determination of efficacy. The limited noncomparative evidence is insufficient to determine the effect of UAE on health outcomes.

### **Uterine Arteriovenous Malformation**

#### **Clinical Context and Therapy Purpose**

Uterine AVMs are rare but may cause severe genital hemorrhaging. There are two types: low-flow AVM is characterized by an abnormal vascular network without visible early venous drainage, and high-flow AVM, which has early venous drainage. Uterine AVMs may be congenital or acquired. Risk factors for acquired AVMs are prior uterine surgery such as dilatation and curettage, myomectomy, and cesarean section.

The purpose of transcatheter UAE in patients who have a uterine AVM is to provide a treatment option that is an alternative to or an improvement on existing therapies.

The question addressed in this evidence review is: Does transcatheter UAE improve the net health outcomes in women with AVM?

The following PICOs were used to select literature to inform this review.

#### **Patients**

The relevant populations of interest are women with uterine AVM.

#### **Interventions**

The intervention of interest is transcatheter UAE, which is a minimally invasive technique in which a catheter is used to inject small embolic agents into the uterine arteries and block the blood supply. Transcatheter UAE is administered by a physician in a tertiary care setting.

#### **Comparators**

The following therapies, most of which are more invasive, are currently being used to make decisions about AVM: medication or hysterectomy. Hysterectomy is performed by a physician in a tertiary care setting.

#### **Outcomes**

The general outcomes of interest, by indication, include symptom control (up to three years) and reintervention rates (up to three years).<sup>29</sup>

#### **Study Selection Criteria**

Methodologically credible studies were selected using the following principles:

- To assess efficacy outcomes, comparative controlled prospective trials were sought, with a preference for RCTs.
- In the absence of such trials, comparative observational studies were sought, with a preference for prospective studies.
- To assess long-term outcomes and adverse effects, single-arm studies that capture longer periods of follow-up and/or larger populations were sought.
- Studies with duplicative or overlapping populations were excluded.

No RCTs or other comparative studies evaluating UAE for treating AVMs were identified. The published literature consists of case reports, small case series, and a systematic review.

### **Systematic Reviews**

A systematic review by Yoon et al (2016) of literature on acquired uterine AVMs identified 54 women treated with UAE in 40 studies published between 2003 and 2013, primarily case reports.<sup>30</sup> There were 22 unilateral and 32 bilateral procedures. Thirty-three (61%) of 54 patients had symptoms controlled with the initial embolization procedure. Nine of 13 patients who underwent repeat UAE experienced resolution of symptoms. No major complications were reported after UAE.

### **Case Series**

The following case series were published after the Yoon et al (2016) systematic review. Barral et al (2017) described using ethylene vinyl alcohol copolymer (Onyx) as the embolic agent for UAE in the treatment of uterine AVMs.<sup>29</sup> Records from 12 women (mean age, 33 years) were reviewed. After a mean follow-up of 29 months, 11 of the 12 women achieved clinical success, defined as the absence of bleeding at 1 month following embolization.

A large series, published by Kim et al (2014) in Korea, retrospectively reviewed data from a single-center on 19 patients who underwent UAE as first-line treatment of bleeding uterine AVMs.<sup>31</sup> All patients presented with intermittent or progressive vaginal bleeding after gynecologic procedures or obstetric events. The UAE procedures were bilateral, and a variety of embolization agents were used. Seventeen (89.5%) of 19 patients had immediate clinical success following the UAE, defined as a cessation of bleeding without symptom recurrence and resolution of the uterine AVMs on postoperative imaging studies.

### **Section Summary: Uterine AVM**

The limited noncomparative evidence is insufficient to determine the effect of UAE on health outcomes in patients with bleeding associated with uterine AVMs. Additional data, ideally from controlled trials comparing UAE with alternative uterine-sparing treatments, are needed to determine the safety and efficacy of UAE for treating uterine AVMs.

### **Adenomyosis**

#### **Clinical Context and Therapy Purpose**

The purpose of transcatheter UAE in patients who have adenomyosis is to provide a treatment option that is an alternative to or an improvement on existing therapies.

The question addressed in this evidence review is: Does transcatheter UAE improve the net health outcomes in women with adenomyosis?

The following PICOs were used to select literature to inform this review.

#### **Patients**

The relevant populations of interest are women with adenomyosis.

Adenomyosis is characterized by the diffuse or focal growth of endometrial glandular and stromal tissue in the muscular layer of the uterus. The etiology of adenomyosis is unknown. Symptoms include dysmenorrhea, menorrhagia, infertility, and an enlarged uterus, which may be found on physical examination.

#### **Interventions**

The intervention of interest is transcatheter UAE, which is a minimally invasive technique in which a catheter is used to inject small embolic agents into the uterine arteries and block the blood supply. Transcatheter UAE is administered by a physician in a tertiary care setting.

#### **Comparators**

The following therapies, most of which are more invasive, are currently being used to make decisions about adenomyosis: medication or hysterectomy. Hysterectomy is performed in a tertiary care setting.

## Outcomes

The general outcomes of interest include QOL (up to five years) and symptom control (up to five years).

**Table 2. Outcomes of Interest for Individuals with Adenomyosis Treated With UAE**

| Measure  | Outcome Evaluated        | Description  | Follow-up Timing         |
|--|--------------------------|--|--------------------------|
| Uterine Fibroid Symptom & Health-Related Quality of Life (UFS-QOL) questionnaire | Symptoms/Quality of Life | A 37-question questionnaire that evaluates symptoms of uterine fibroids and their impact on health-related quality of life; patients answer questions on a Likert-type scale of 1-5 (1 = None of the time, 5 = All of the time). <sup>32</sup> | During previous 3 months |

UAE: uterine artery embolization.

## Study Selection Criteria

Methodologically credible studies were selected using the following principles:

- To assess efficacy outcomes, comparative controlled prospective trials were sought, with a preference for RCTs.
- In the absence of such trials, comparative observational studies were sought, with a preference for prospective studies.
- To assess long-term outcomes and adverse effects, single-arm studies that capture longer periods of follow-up and/or larger populations were sought.
- Studies with duplicative or overlapping populations were excluded.

## Randomized Controlled Trials

No RCTs or other comparative studies evaluating UAE for treating adenomyosis were identified.

## Systematic Reviews

In a systematic review of publications from 1999 through 2010, Popovic et al (2011) evaluated the literature on UAE for patients with adenomyosis, alone or in conjunction with uterine fibroids.<sup>33</sup> Reviewers identified eight case series reporting short-term follow-up in patients with adenomyosis alone. After a median follow-up of 9.4 months (range, 3-12 months), 85 (83%) of 102 patients had marked or complete improvement in clinical symptoms. Six case series reported on long-term follow-up (median, 40.6 months; range, 17-60 months). Marked or complete improvement occurred in 135 (65%) of 208 patients, suggesting recurrence of symptoms over time in some patients. No deaths or serious adverse events were reported.

## Case Series

Additional case series have been published since the Popovic et al (2011) review. De Bruijn et al (2017) provided 7-year QOL data on 28 women with adenomyosis treated with UAE.<sup>34</sup> Outcomes were Uterine Fibroid Symptom Quality of Life (UFS-QOL) questionnaire and Symptom Severity Score (SSS). A higher UFS-QOL score indicates a better QOL and a lower SSS indicates an improvement in symptoms. Patients were considered asymptomatic if their SSS was less than 20 and their UFS-QOL score was greater than 80.

At seven years posttreatment, three women had undergone a second UAE, and five women had undergone a secondary hysterectomy. Median SSS at baseline was 72 (range, 23-100) and improved to 17 (range, 0-44). Median UFS-QOL score at baseline was 31 (range, 20-88) and improved to 98 (range, 9-100).

Zhou et al(2016) evaluated short-term (12-months) and long-term (5-year) outcomes for 252 women following UAE treatment for adenomyosis.<sup>32</sup> Outcomes of interest were dysmenorrhea and menorrhagia. Subgroup analyses were conducted by lesion vascularity: (1) blood supply equality of the uterus ("equal" if left and right uterine arteries supplied blood equally, otherwise "unequal") and (2) vascularity degree ("hypervascular" if vessels abundant at margin and center of lesions, "isovascular" if vessels abundant at margin but not core, and "hypovascular" if vessels

lacking at margin and core). Following UAE, both short- and long-term rates of dysmenorrhea improvement and menorrhagia improvement were statistically similar among the equal and unequal blood supply groups, with improvement rates reported between 68% and 77%. However, improvement rates in dysmenorrhea and menorrhagia differed statistically among the vascularity groups, with patients in the hypervascular group experiencing higher rates of improvement than the other groups.

Wang et al (2016) prospectively reported on 117 premenopausal patients with adenomyosis who underwent UAE.<sup>35</sup> A total of 115 (98%) of 117 patients who successfully underwent bilateral UAE were included in the analysis. At 12 months, patients were queried about change in dysmenorrhea symptoms. Thirteen (11.3%) patients reported slight symptom improvement, 64 (55.7%) reported moderate improvement, and 31 (27.0%) reported marked improvement. Seven (6%) patients reported no change.

Bae et al (2015) retrospectively reviewed outcomes for 50 women who underwent UAE for symptomatic adenomyosis and were followed for at least 18 months.<sup>36</sup> At baseline, 41 (82%) of 50 women had both heavy menstrual bleeding and dysmenorrhea; the remainder reported only 1 of these 2 symptoms. The extent of postprocedure necrosis of adenomyosis imaged with magnetic resonance imaging was significantly associated with the likelihood of experiencing symptoms at follow-up. In receiver operating characteristic curve analysis, a cutoff of 34.3% necrosis was the most predictive of symptom recurrence (area under the curve, 0.721; 95% CI, 0.577 to 0.839;  $p=0.004$ ). Among 12 patients with less than 34.3% necrosis, 58% were symptom-free at 18 months; among 40 patients with greater than 34.3% necrosis, 94% were symptom-free at 18 months.

### Section Summary: Adenomyosis

There is a lack of RCTs or other controlled comparative studies assessing the UAE for the treatment of adenomyosis. Several case series and a systematic review are available. The systematic review found short-term symptom improvement in 83% of patients and long-term improvement in 65% of patients. Preliminary evidence from case series published after the systematic review has shown that patients with greater necrosis of adenomyosis and patients with higher vascularity of lesions had higher response rates to UAE. A case series with 7 years of follow-up reported that 5 (18%) of 28 patients underwent a subsequent hysterectomy. Additional data from controlled trials are needed, especially on long-term efficacy and recurrence rates.

### Summary of Evidence

For individuals who have uterine fibroids who receive transcatheter UAE, the evidence includes RCTs and systematic reviews. The relevant outcomes are symptoms, QOL, and treatment-related morbidity. The majority of studies have compared UAE with hysterectomy and myomectomy and found similar levels of symptoms and QOL across all treatment groups. Benefits for women undergoing UAE included avoiding surgery and maintaining their uteruses, lower complication rates, and lower blood transfusion rates. However, patients undergoing UAE had higher reintervention rates compared with patients who had surgery. Smaller trials have compared UAE with laparoscopic occlusion and magnetic resonance image-guided focused ultrasound surgery. Additional trials with larger sample sizes comparing UAE with these and other uterus-preserving procedures are needed. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

For individuals who have persistent uterine fibroids despite prior UAE who receive repeat transcatheter UAE, the evidence includes case series. The relevant outcomes are symptoms, QOL, and treatment-related morbidity. Case series have shown that a high degree of symptom relief is possible after a repeat UAE for uterine fibroids. Moreover, evidence from RCTs on the safety and efficacy of UAE for initial treatment of uterine fibroids suggests a benefit for patients in need of repeat procedures for the same indication. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

For individuals who have postpartum uterine hemorrhage who receive transcatheter UAE, the evidence includes case series and a systematic review. The relevant outcomes are overall survival, symptoms, and treatment-related morbidity. The systematic review of case series assessing over 1400 women reported success rates of bleeding cessation that ranged from 58% to 98%. Postpartum uterine hemorrhage is an emergency situation with serious potential consequences (i.e., maternal mortality). Conducting RCTs is particularly difficult in this setting and may be unnecessary when there are sufficient uncontrolled data. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

For individuals who have cervical ectopic pregnancy who receive transcatheter UAE, the evidence includes case series. The relevant outcomes are treatment-related morbidity. Only a few case series with a small number of patients have been published. Additional studies, especially controlled studies comparing UAE with medication or surgery, are needed to assess the safety and efficacy of UAE in patients with cervical ectopic pregnancy. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have uterine AVMs who receive transcatheter UAE, the evidence includes case reports, case series, and a systematic review. The relevant outcomes are symptoms and treatment-related morbidity. Only case reports and case series with a small number of patients have been published. A systematic review identified 54 women in 40 studies with uterine AVMs treated with UAE. Additional controlled studies comparing UAE with hysterectomy are needed to assess the safety and efficacy of UAE in patients with uterine AVMs. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have adenomyosis who receive transcatheter UAE, the evidence includes case series and a systematic review. The relevant outcomes are symptoms and treatment-related morbidity. A systematic review of case series data found short-term improvement in 83% of patients and long-term improvement in 65% of patients, suggesting possible recurrence of symptoms over time. All studies were case series, which might have been subject to selection and/or observational biases. Additional case series published after the review has reported that patients with greater necrosis of adenomyosis and patients with higher vascularity of lesions may experience higher response rates to UAE. Controlled studies comparing UAE with medication or surgery and reporting long-term symptom recurrence rates are needed. The evidence is insufficient to determine the effects of the technology on health outcomes.

### **Supplemental Information**

#### **Clinical Input From Physician Specialty Societies and Academic Medical Centers**

While the various physician specialty societies and academic medical centers may collaborate with and make recommendations during this process, through the provision of appropriate reviewers, input received does not represent an endorsement or position statement by the physician specialty societies or academic medical centers, unless otherwise noted.

In response to requests from Blue Cross Blue Shield Association, input was received from 3 physician specialty societies and 2 academic medical centers in 2012. There was a consensus that uterine artery embolization (UAE) is medically necessary for treating uterine fibroids and near-consensus agreement that UAE is medically necessary for treating postpartum hemorrhage, particularly for the indications stated in the American College of Obstetricians and Gynecologists Practice Bulletin No. 76. Clinical input was mixed on repeat UAE and UAE for managing the cervical ectopic pregnancy. One reviewer who disagreed that repeat UAE is investigational provided detailed input on clinical situations in which a repeat procedure might be appropriate.



## Practice Guidelines and Position Statements

### American College of Obstetricians and Gynecologists

The ACOG (2014) reaffirmed its 2008 practice bulletin on alternatives to hysterectomy in the management of leiomyomas.<sup>37</sup> This Bulletin (No. 96) contained the following statement on UAE: "Based on long- and short-term outcomes, uterine artery embolization is a safe and effective option for appropriately selected women who wish to retain their uteri."

The ACOG (2013) issued a committee opinion on the management of acute abnormal uterine bleeding in nonpregnant reproductive-aged women.<sup>38</sup> This opinion was reaffirmed in 2017. The ACOG listed UAE among the surgical options for acute abnormal uterine bleeding and stated that the need for surgical treatment, including UAE, is based on the clinical stability of the patient, the severity of bleeding, contraindications to medical management, the patient's lack of response to medical management, and the underlying medical condition of the patient.

The ACOG (2017) published a practice bulletin (No. 183) on a postpartum hemorrhage.<sup>39</sup> UAE was recommended when less invasive techniques (uterotonic agents, uterine massage, uterine compression, manual removal of clots) failed. Studies have shown that the median success rate is 89% (range, 58%-98%).

### Society of Interventional Radiology

The quality improvement guidelines from the Society of Interventional Radiology (2010; reviewed and unchanged in 2014) stated that UAE is indicated in women with uterine leiomyomas causing significant symptoms.<sup>40</sup> Absolute contraindications to UAE included a viable pregnancy, active infection, and suspected uterine, cervical, or adnexal malignancy (unless the procedure is being performed for palliation or in conjunction with surgery). A desire to maintain fertility was deemed a relative contraindication.

### American College of Radiology

The American College of Radiology (2018) published appropriateness criteria on the radiologic management of uterine fibroids.<sup>41</sup> The College provided six scenarios when the use of transcatheter UAE presents a favorable risk-benefit ratio for patients and can be considered "usually appropriate". Two of the scenarios involved child-bearing aged women with fibroids, one in which the woman did not want a hysterectomy and one in which the woman would keep her fertility options open. Four of the scenarios involved middle-aged women with fibroids accompanied by urinary frequency or bloating, diffuse adenomyosis, pelvic discomfort, and constipation.

### U.S. Preventive Services Task Force Recommendations

Not applicable.

### Medicare National Coverage

There is no national coverage determination. In the absence of a national coverage determination, coverage decisions are left to the discretion of local Medicare carriers.

### Ongoing and Unpublished Clinical Trials

Some currently ongoing and unpublished trials that might influence this review are listed in Table 3.

**Table 3. Summary of Key Trials**

| NCT No.        | Trial Name  | Planned Enrollment | Completion Date |
|----------------|---|--------------------|-----------------|
| <b>Ongoing</b> |   |                    |                 |
| NCT02942537    | Single Blinded Randomized Study of Volume Reduction of Uterine Fibroids after Uterine Artery Embolization versus Computer Tomography or Ultrasound Guided Percutaneous Microwave Ablation Evaluated by Magnetic Resonance Imaging | 36                 | Feb 2020        |

| NCT No.                  | Trial Name   | Planned Enrollment | Completion Date      |
|--------------------------|--|--------------------|----------------------|
| NCT02260752              | Comparing Options in Management: Patient-Centered Results for Uterine Fibroids   | 3,094              | Apr 2020             |
| NCT01563783 <sup>a</sup> | The TRUST (Treatment Results of Uterine Sparing Technologies) Study  | 260                | Dec 2022             |
| NCT02163525 <sup>a</sup> | The TRUST (Treatment Results of Uterine Sparing Technologies) U.S.A. Study   | 114                | Jun 2024             |
| <b>Unpublished</b>       |  |                    |                      |
| NCT02819609 <sup>a</sup> | Comparing Patient-Centered Outcomes after Treatment for Uterine Fibroids   | 12,234             | Jan 2015 (completed) |
| NCT02884960 <sup>a</sup> | Safety and Efficacy of Embosphere® Microspheres for Uterine Fibroid Embolization Compared to Embosphere® Microspheres for Symptomatic Relief from Uterine Fibroids | 118                | Oct 2018             |

NCT: national clinical trial.

<sup>a</sup> Denotes industry-sponsored or cosponsored trial.

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40. Dariushnia SR, Nikolic B, Stokes LS, et al. Quality improvement guidelines for uterine artery embolization for symptomatic leiomyomata. J Vasc Interv Radiol. Nov 2014;25(11):1737-1747. PMID 25442136.
41. Expert Panel on Interventional R, Knuttinen MG, Stark G, et al. ACR Appropriateness Criteria((R)) radiologic management of uterine leiomyomas. J Am Coll Radiol. May 2018;15(5S):S160-S170. PMID 29724419.
42. Blue Cross Blue Shield Association. Medical Policy Reference Manual, No. 4.01.11 (August 2019).

## Documentation for Clinical Review

### Please provide the following documentation (if/when requested):

- History and physical and/or consultation notes including:
  - Reason for treatment request
  - Past medical/surgical treatment and response
  - Treatment plan

### Post Service

- Operative report(s)

## Coding

*This Policy relates only to the services or supplies described herein. Benefits may vary according to product design; therefore, contract language should be reviewed before applying the terms of the Policy. Inclusion or exclusion of codes does not constitute or imply member coverage or provider reimbursement.*

**MN/IE**

The following services may be considered medically necessary in certain instances and investigational in others. Services may be considered medically necessary when policy criteria are met. Services may be considered investigational when the policy criteria are not met or when the code describes application of a product in the position statement that is investigational.

| Type                    | Code    | Description  |
|-------------------------|---------|--|
| <b>CPT®</b>             | 36245   | Selective catheter placement, arterial system; each first order abdominal, pelvic, or lower extremity artery branch, within a vascular family  |
|                         | 36246   | Selective catheter placement, arterial system; initial second order abdominal, pelvic, or lower extremity artery branch, within a vascular family  |
|                         | 36247   | Selective catheter placement, arterial system; initial third order or more selective abdominal, pelvic, or lower extremity artery branch, within a vascular family   |
|                         | 37243   | Vascular embolization or occlusion, inclusive of all radiological supervision and interpretation, intraprocedural roadmapping, and imaging guidance necessary to complete the intervention; for tumors, organ ischemia, or infarction                    |
|                         | 37244   | Vascular embolization or occlusion, inclusive of all radiological supervision and interpretation, intraprocedural roadmapping, and imaging guidance necessary to complete the intervention; for arterial or venous hemorrhage or lymphatic extravasation |
| <b>HCPCS</b>            | None    |  |
| <b>ICD-10 Procedure</b> | 04LE3DT | Occlusion of Right Uterine Artery with Intraluminal Device, Percutaneous Approach  |
|                         | 04LE3ZT | Occlusion of Right Uterine Artery, Percutaneous Approach   |
|                         | 04LF3DU | Occlusion of Left Uterine Artery with Intraluminal Device, Percutaneous Approach   |
|                         | 04LF3ZU | Occlusion of Left Uterine Artery, Percutaneous Approach  |

## Policy History

This section provides a chronological history of the activities, updates and changes that have occurred with this Medical Policy.

| Effective Date | Action  | Reason                   |
|----------------|---|--------------------------|
| 02/25/1998     | New Policy Adoption   | Medical Policy Committee |
| 02/23/2000     | Policy Review   | Medical Policy Committee |
| 05/30/2000     | Policy revision with position change  | Medical Policy Committee |
| 08/01/2002     | Coding update   | Administrative Review    |
| 11/02/2002     | Coding update   | Administrative Review    |
| 04/02/2010     | Policy Revision with title change from Uterine Artery Embolization (UAE) for Uterine Myomata (Fibroids) | Medical Policy Committee |
| 01/11/2013     | Policy revision with position change  | Medical Policy Committee |
| 04/04/2014     | Coding Update   | Administrative Review    |
| 09/30/2014     | Policy revision with position change<br>Policy title change from Uterine Artery Embolization            | Medical Policy Committee |
| 10/01/2016     | Policy revision without position change   | Medical Policy Committee |
| 10/01/2017     | Policy revision without position change   | Medical Policy Committee |

| Effective Date | Action                                  | Reason                   |
|----------------|---|--------------------------|
| 10/01/2018     | Policy revision without position change | Medical Policy Committee |
| 10/01/2019     | Policy revision without position change | Medical Policy Committee |

### Definitions of Decision Determinations

**Medically Necessary:** A treatment, procedure, or drug is medically necessary only when it has been established as safe and effective for the particular symptoms or diagnosis, is not investigational or experimental, is not being provided primarily for the convenience of the patient or the provider, and is provided at the most appropriate level to treat the condition.

**Investigational/Experimental:** A treatment, procedure, or drug is investigational when it has not been recognized as safe and effective for use in treating the particular condition in accordance with generally accepted professional medical standards. This includes services where approval by the federal or state governmental is required prior to use, but has not yet been granted.

**Split Evaluation:** Blue Shield of California/Blue Shield of California Life & Health Insurance Company (Blue Shield) policy review can result in a split evaluation, where a treatment, procedure, or drug will be considered to be investigational for certain indications or conditions, but will be deemed safe and effective for other indications or conditions, and therefore potentially medically necessary in those instances.

### Prior Authorization Requirements (as applicable to your plan)

Within five days before the actual date of service, the provider must confirm with Blue Shield that the member's health plan coverage is still in effect. Blue Shield reserves the right to revoke an authorization prior to services being rendered based on cancellation of the member's eligibility. Final determination of benefits will be made after review of the claim for limitations or exclusions.

Questions regarding the applicability of this policy should be directed to the Prior Authorization Department. Please call (800) 541-6652 or visit the provider portal at [www.blueshieldca.com/provider](http://www.blueshieldca.com/provider).

*Disclaimer: This medical policy is a guide in evaluating the medical necessity of a particular service or treatment. Blue Shield of California may consider published peer-reviewed scientific literature, national guidelines, and local standards of practice in developing its medical policy. Federal and state law, as well as contract language, including definitions and specific contract provisions/exclusions, take precedence over medical policy and must be considered first in determining covered services. Member contracts may differ in their benefits. Blue Shield reserves the right to review and update policies as appropriate.*