Pregnancy in Women With Prior Treatments for Pelvic Floor Disorders

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Abstract: Although the peak incidence of surgery for pelvic floor disorders does not occur until after menopause, an increasing number of younger women are seeking treatment for these problems. Whereas most surgeons would recommend delaying surgery until the completion of childbearing, published cases and case series address outcomes after subsequent pregnancies in women who have been treated for urinary incontinence and pelvic organ prolapse. This document synthesizes the available evidence on the impact of pregnancy on women with prior treatment for pelvic floor disorders and on the impact of these prior treatments on subsequent pregnancy. Pregnancy after the repair of obstetrical anal sphincter laceration is also discussed. Consensus recommendations are presented based on available literature review and expert involvement.

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Although the peak incidence of surgery for pelvic floor disorders does not occur until after menopause,[1] a substantial number of women undergo surgery for stress urinary incontinence (SUI) and prolapse during their reproductive years.[2,3] Meanwhile, the birth rate among older women has increased dramatically.[4] Because younger women seek treatment for pelvic floor disorders and as childbirth becomes increasingly common among older women, it is inevitable that some women will become pregnant after surgical treatment for incontinence or prolapse.

This review is intended to synthesize the available evidence on the impact of pregnancy in women with prior treatments for incontinence and prolapse. In addition, the review also addresses future pregnancy after obstetrical anal sphincter laceration, a complication that occurs in up to 5% of first vaginal deliveries.[5–7] The overall goal of this review is to serve as a reference for physicians providing counseling and advice to women about pregnancy in the setting of prior surgical treatment for pelvic floor disorders.

METHODS

This document is written on the behalf of the American Urogynecologic Society (AUGS) Guidelines and Statements Committee. The topic of pregnancy in women with prior treatments for pelvic floor disorders was proposed to the AUGS membership at the end of 2017 and approved by the AUGS Board of Directors. The writing group conducted a literature search using Medline and Scopus from their inception until March 16, 2018. The search

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terms included numerous MeSH terms for pregnancy, delivery, and pelvic floor disorders (Appendix 1). Additional articles were identified based on references cited in the articles reviewed. Only articles in the English language were included. There were not enough data to conduct a systematic review, and formal clinical practice guidelines could not be made on the basis of available evidence. Instead, summary recommendations based on level III evidence were created. The draft of the document was approved by the AUGS Boards of Directors in 2019. The summary and recommendations were divided into 3 sections: pregnancy and childbirth after surgery for SUI, pregnancy and childbirth after pelvic organ prolapse surgery, and pregnancy and childbirth after obstetric anal sphincter laceration repair.

Pregnancy and Childbirth After Surgery for SUI

Although surgery for SUI traditionally is reserved for women who have completed childbearing, pregnancies after anti-incontinence procedures have been reported in the literature. This section reviews evidence to support recommendations for pregnancy after surgery for SUI, which is mostly level III.

Efficacy of Anti-incontinence Surgery After Subsequent Delivery

Midurethral Sling

Although SUI may recur in women who become pregnant after MUS, most of the published literature suggests more reassuring outcomes. In a cohort study comparing 163 Swedish women who underwent midurethral sling (MUS) to 374 controls (matched for age and year of surgery), pregnancy and delivery after MUS were not associated with an increased risk of SUI recurrence.[8] Two case series by Adams-Piper et al[9] report on pregnancies after MUS in a large managed-care organization in California. The first describes 15 patients who delivered after MUS. Of 11 women who were continent after the original MUS operation, 2 had recurrent SUI after delivery (1 vaginal birth and 1 cesarean delivery).[9] A subsequent series of 26 additional women who became pregnant after MUS reported recurrent SUI in 1 of 21 women who were continent before the pregnancy. Over half the cohort delivered by cesarean birth, including the woman who developed recurrent SUI.[10] These data suggest that SUI recurs in a small proportion of women who deliver after successful MUS.

These findings are corroborated by smaller case series and case reports, which include examples of outcomes after both vaginal delivery[11–13] and cesarean delivery.[14,15] One case series demonstrates the additional observation of normal positioning of the sling mesh beneath the urethra on ultrasound postpartum.[12] There also are reports describing maintenance of continence after vaginal delivery after full-length and single-incision transobturator MUS.[16,17]

Retropubic Colposuspension

There is limited evidence of the efficacy of retropubic colposuspension surgeries after subsequent deliveries. As early as the

1950s, reports of pregnancy after these procedures were published. In a review of outcomes in 132 patients who underwent retropubic colposuspension to the periosteum, Marchetti[18] described 5 pregnancies among 4 women resulting in 4 vaginal deliveries and 1 cesarean delivery. All patients were apparently continent postpartum. A later case series of 270 women who underwent retropubic colposuspension to the periosteum includes 3 women who subsequently became pregnant and delivered vaginally without recurrent SUI.[19] Importantly, neither case series included outcome measures or follow-up details.

Additional publications suggest similar outcomes after retropubic colposuspension to the pectineal ligament. One detailed case report describes a 37-year-old woman who remained stress continent on urodynamic testing 6 weeks postpartum after delivering by cesarean, 5 years after a retropubic colposuspension to the pectineal ligament.[20] A case series of an additional 4 women with similar histories revealed similar findings after longer postpartum follow-up.[21]

Pubovaginal Sling

A case series of 9 women who completed pregnancies after autologous pubovaginal sling reported urinary continence after delivery. Their pregnancies occurred 1 to 3 years after surgery, and 7 of the 9 women delivered vaginally. Eight of the women who had good outcomes from the sling reported unchanged continence postpartum.[22]

Artificial Sphincter

Pregnancy after augmentation cystoplasty with artificial sphincter (among women with neural tube defects or bladder exstrophy) has been described in the literature. In a case series of 13 such women, 11 had spontaneous vaginal deliveries and 2 underwent cesarean delivery. Only 1 of the 13 patients had postpartum urinary incontinence, and this was transient. The authors suggest that, because cesarean delivery increases the risk of iatrogenic injury to the reconstructed bladder in these women and because vaginal delivery does not seem to compromise postpartum continence in women with artificial urethral sphincter, vaginal delivery might be preferred (unless there are obstetric indications for cesarean delivery).[23]

Safety Concerns During Pregnancy in Women Who Have Undergone Surgery for SUI

A 2012 systematic review concluded that there is likely minimal risk to women during pregnancies after anti-incontinence surgery, but the heterogeneity of the data reviewed prevented meta-analysis.[24] However, adverse events have been reported in this setting. A case report from 2001 describes voiding dysfunction at 18 weeks gestation with complete urinary retention at 25 weeks in a 26-year-old woman who had undergone 2 prior anti-incontinence procedures (a needle suspension followed by a bone anchor pubovaginal sling using a bovine collagen injected woven polyester mesh).[25] A more recent case report describes a 35-year-old woman who developed voiding dysfunction and overflow incontinence at 17 weeks of gestation, 2 years after a transobturator MUS. She ultimately required sling lysis during the second trimester and unfortunately developed recurrent SUI during her pregnancy; this persisted 1 year postpartum.[26]

Mode of Delivery for Women Who Have Undergone Surgery for SUI

Literature guiding decisions about route of delivery in pregnancies after anti-incontinence surgery is equivocal and includes case reports, case series, and surveys of health care providers. A few studies have compared continence by route of delivery after

MUS procedures. These case series[8,27–29] suggest no difference in the rate of recurrent SUI between women who underwent cesarean versus vaginal delivery.[27] Unfortunately, given the small number of cases reported and the absence of any randomized trials, it is impossible to draw any firm conclusions about whether recurrent SUI differs by route of delivery. On this basis, several authors concur that the mode of delivery for women who have undergone surgery for SUI should be decided on a case-by-case basis but that vaginal delivery is a reasonable choice.[30–32]

Effect of Pregnancy and Delivery in Patients Who Have Had Sacral Neuromodulation

Because the effects of electrical stimulation during pregnancy are unknown, both the device manufacturer (Medtronic, Minneapolis, MN) and the International Urogynecologic Association recommend turning off the device when planning pregnancy or during pregnancy.[33,34] However, a survey of sacral neuromodulation (SNM) in pregnant women showed that only two thirds of pregnant women switched off the device.[35]

Three case series and 6 case reports have addressed the efficacy of neuromodulation and the need for device revision or replacement after childbirth.[36–44] A recent systematic review described 25 pregnancies after SNM. The SNM device was inactivated during pregnancy among 17 of these pregnancies. Fifteen of these 17 women had worsened symptoms during pregnancy. All patients who kept the device on had stable symptoms during pregnancy. Similarly, a cases series of 27 women reported bothersome urinary symptoms during pregnancy among 26 whose SNM device was inactivated before or during the first trimester.[39]

Safety Concerns and Other Considerations During Pregnancy in Women Treated With SNM

Animal studies suggest that electrical stimulation of the sacral nerves is safe in pregnant rats, with no fetal anomalies or pregnancy losses noted.[45] Sacral nerve stimulation in nonpregnant women showed that SNM had an inhibitory effect on uterine activity. However, the effect on the pregnant uterus is unknown.[46]

Of 52 pregnancies after SNM reported in the literature, only 2 fetal complications have been reported,[39,47] both in the same patient. She had intractable bladder pain and choose to keep her implantable pulse generator (IPG) on during both pregnancies. Her first baby developed a chronic motor tic at age of 2 years, and her second child had a pilonidal cyst. It is not clear if these diagnoses were related to the SNM. Another patient who kept the device's IPG on during pregnancy did not have any adverse effects during pregnancy or delivery.[40]

Preterm deliveries have been documented in 8 of 52 pregnancies in patients with SNM. However, in all patients, the SNM device had been turned off before or during the first trimester.[39,47]

Mode of Delivery After SNM

Device malfunction has been reported after vaginal and cesarean delivery.[47] A displaced and broken IPG lead also has been reported after a vacuum-assisted vaginal delivery.[42] Similarly, a case series of 20 deliveries found that in 4 women in whom the device was reactivated postpartum, there was a reduction in the efficacy of the system.[39] Two of the deliveries were vaginal, and 2 were cesarean deliveries. The decreased efficacy was linked to lead displacement in 2 women, but no cause was found in the other women. Neuraxial anesthesia does not appear to cause lead migration.[36]

Pregnancy and Childbirth After Pelvic Organ Prolapse Surgery

Leaving the uterus in situ in women of reproductive age may result in pregnancy, either accidental or planned. Therefore, women with prior hysteropexy may seek advice from their women's health provider either before or after becoming pregnant.

Efficacy of Pelvic Organ Prolapse Surgery After Subsequent Pregnancy and Delivery

Sacral Hysteropexy

There are 3 case series and 2 case reports in the literature describing women who have become pregnant after open or laparoscopic sacrohysteropexy (SH).[48–52]

There are 2 case reports of women becoming pregnant after open SH. The first woman had an elective cesarean delivery, with "satisfactory" support at 24-month follow-up.[48] The other woman delivered via cesarean birth because of fetal distress at 6 cm cervical dilation. She had no subjective recurrent prolapse after several years of follow-up.[49] Finally, among 30 women who underwent open SH with anterior and posterior polyester mesh placement, 3 became pregnant 3 to 6 years after the procedure.[50] All 3 patients decided to terminate their pregnancies, including 2 for fear of recurrent prolapse.

Two case reports[51,52] describe women who became pregnant after laparoscopic SH with placement of a posterior polypropylene mesh arm only. Both women underwent scheduled cesarean deliveries. One woman has no recurrence at 1-year follow-up,[51] whereas the other woman developed recurrent stage II anterior and posterior compartment prolapse 2 years postpartum.[52]

Transvaginal Mesh for Prolapse

We are aware of only one reported case of pregnancy after transvaginal mesh for prolapse.[53] In this case report, the woman became pregnant 8 weeks postoperatively and underwent an elective cesarean delivery at term. She did not have any subjective or objective pelvic organ prolapse quantification evidence of recurrent prolapse at 2 years follow-up.

Uterosacral Ligament Hysteropexy

Two case series describe 4 women who delivered after laparoscopic uterosacral ligament hysteropexy.[54,55] All women delivered via cesarean birth, and 3 had no prolapse recurrence at a mean follow-up of 12 months. One patient experienced recurrence at 11 months postdelivery and underwent a repeat prolapse repair.

Sacrospinous Ligament Hysteropexy

A 1993 case series reported on 9 pregnancies in 8 women, 1 to 4 years after sacrospinous ligament hysteropexy. All patients delivered vaginally, and 1 patient developed a prolapse recurrence postpartum.[56]

More recent data include 3 women who became pregnant after sacrospinous ligament hysteropexy[54,57] All women delivered via cesarean birth, and 1 of the patients developed prolapse recurrence at an unknown time point. One of the patients had no recurrent prolapse 2 years postdelivery.[57]

Manchester Procedure

The Classic Manchester Procedure involves distal cervical amputation and reattachment of the proximal cervix to the cardinal ligaments. In contrast, the Modified Manchester Procedure includes plication of the cardinal ligaments anteriorly and uterosacral ligaments posteriorly without cervical amputation to improve the support of the apex.[58,59] A meta-analysis by Gutman and Maher describes 12 vaginal deliveries after the Modified Manchester procedure with 1 documented prolapse recurrence.[58]

Safety Concerns During Pregnancy in Women Who Have Undergone Surgery for Pelvic Organ Prolapse

The use of anterior mesh during SH may be contraindicated in women of childbearing age who have not undergone sterilization because the mesh could potentially restrict uterine changes required to support the growing fetus.[60] Two case reports suggest that the posterior mesh arm may cause pain during the third trimester as pregnancy progresses.[51,52] One patient developed increasing pain at 34 weeks, which was attributed to tension on the mesh. She underwent a preterm cesarean delivery to ameliorate the pain. Her pain resolved after delivery.[51] A second patient also developed mesh pain in the third trimester, which was relieved with a pessary.

In the case of pregnancy and delivery after transvaginal mesh for prolapse, sited previously,[53] there were no obstetric complications noted during pregnancy.

A 1951 case series of pregnancy after Traditional Manchester operation (with cervical amputation) reported a high risk of spontaneous abortions and premature deliveries. Only 3 of the 14 pregnancies described were carried to term, and all 3 were delivered via cesarean birth.[61]

Mode of Delivery for Women Who Have Undergone Surgery for Pelvic Organ Prolapse

We found no reported cases of vaginal delivery after SH with mesh. There are theoretical concerns for vaginal delivery given the rigidity of the mesh placed over the anterior and/or posterior vaginal walls. In 1 case report of cesarean delivery after transvaginal mesh, the surgeons were able to exteriorize the fundus during cesarean delivery.[52]

We found no reported vaginal deliveries after uterosacral ligament hysteropexy. However, both vaginal and cesarean deliveries have been described after sacrospinous ligament hysteropexy. Because of very limited data, it is not possible to make recommendations regarding the mode of delivery after these procedures.

Finally, women with a history of a traditional Manchester operation with cervical amputation might have preterm labor and labor abnormalities.[61] There are no known contraindications to vaginal delivery following modified or traditional Manchester procedures.

Pregnancy and Childbirth After Obstetric Anal Sphincter Laceration Repair

The severity of obstetric anal sphincter injury (OASI) is classified based on the involvement of the external anal sphincter and the anal mucosa. A third-degree perineal laceration involves the anal sphincter complex and is divided into 3a, 3b, and 3c. In a 3a laceration, less than 50% of the external anal sphincter is torn, whereas in a 3b laceration, more than 50% of the external anal sphincter is torn. A 3c laceration involves damage to both the external and internal anal sphincter, whereas fourth-degree laceration involves the anal sphincter complex (internal and external) and the anal mucosa.[62] Some researchers divide severity of OASI into lower grade or minor tears (3a and 3b) and higher grade or major tears (3c and 4).[63]

Recurrent OASI: Rates and Risk Factors

After surgical repair of OASI, many women have a subsequent pregnancy. A common concern for these women and their providers is the likelihood of OASI recurrence. The overall rates of OASI recurrence in subsequent pregnancies vary widely in

the literature, ranging between 4% and 10%.[7,64–66] Baghestan et al[7] reported that the odds ratio for repeat OASI was 4.2% in women with 1 prior delivery with OASIs. In women with 2 prior OASIs, the risk of repeat injury in a third delivery was 10.6%.[7] Another study found that a history of 2 prior OASIs increases the risk of repeat injury in a subsequent delivery by 10-fold.[67] Risk of repeat OASIs also may be influenced by the degree of the initial injury. Women with a previous fourth-degree laceration have a much higher rate of recurrence compared with women who sustained a prior third-degree laceration (7.7% vs 4.7%).[68]

Identification of specific obstetric factors that lead to recurrent OASI may assist with secondary prevention. A large meta-analysis found that operative vaginal delivery (forceps and vacuum), large for gestational age fetus (>4 kg), shoulder dystocia, and prior fourth degree laceration[69] were significant predictors of repeat OASI. Maternal age of younger than 35 years marginally increased the risk of recurrence.

A 2014 Cochrane review[70] concluded that risk of repeat OASI could be reduced by a number of interventions including "antenatal pelvic floor muscle strengthening; perineal massage or creams to reduce the risk of perineal tearing, or interventions during labor aimed at reducing the risk of sphincter damage including: earlier induction of labor to reduce the risk of a large baby, elective caesarean section to avoid perineal damage, vacuum extraction as opposed to forceps and selective episiotomy to reduce the risk of severe perineal damage."

It is important to appreciate that recurrent OASI does not always signify recurrent or new anal incontinence symptoms. Ali et al[71] reported outcomes of a vaginally delivered cohort of 82 women, 13% of which resulted in a recurrent OASI. None of these women developed fecal incontinence. However, others have suggested that women with 2 prior OASIs have a nearly 70% risk of long-term anal incontinence.[72]

Mode of Delivery Consideration for Women With Prior OASI

Perhaps the most controversial aspect of care for pregnant women with prior OASI is choosing a plan for mode of delivery. To our knowledge, no randomized trials have addressed this issue. A recent survey of Dutch obstetricians showed that recommendations varied widely,[73] depending on degree of prior OASI and whether patients had had previous symptoms of anal incontinence. Specifically, physicians were more likely to recommend cesarean delivery for women with more severe prior tears and for those with persistent anal incontinence. Faltin et al[74] found that women with sonographic anal sphincter defects (diagnosed during the subsequent pregnancy) were at the highest risk of anal incontinence after repeat vaginal delivery (relative risk, 11.2; 95% confidence interval, 1.4–86.2). A survey in the United Kingdom reported that up to 71% of colorectal surgeons would recommend cesarean delivery to women with prior OASI compared with only 22% of obstetricians.[75] Only 6% based their decisions on the imaging and functional assessment of the anorectum.

In a recent study of patient preferences for mode of delivery after OASIs,[63] 69% of women would prefer to have a subsequent vaginal delivery, irrespective of provider recommendation, to avoid risks associated with cesarean delivery. Women with higher-degree tears were more likely to choose a cesarean delivery in a subsequent delivery. Bowel symptoms were not a dominant factor in women's decisions. Sexual symptoms also guided delivery mode choice for women with lower grades of OASI.

In a cohort of 59 women with prior OASI, Scheer et al[76] defined compromised function as external anal sphincter defect on endoanal ultrasound (>1 hour on a clock face) and low squeeze pressures on manometry (<20 mm Hg). Cesarean delivery was recommended to pregnant women who met these criteria; those who did not were counseled to have a vaginal delivery. They found, however, that there was no deterioration in anal sphincter function in either the vaginal delivery or cesarean delivery groups, even in women with compromised sphincter function who chose to proceed with vaginal delivery.

Karmarkar et al[77] used an assessment protocol for pregnant women with prior OASIs and recommended cesarean delivery to women with symptoms of fecal urgency or anal incontinence as well as evidence of functional and anatomic sphincter compromise (reduced anorectal pressures on manometry and a defect of >30 degrees on endoanal ultrasound). They found that women who had planned vaginal deliveries continued without anal incontinence, and symptoms remained unchanged in those who underwent a planned cesarean delivery.

Fitzpatrick et al[78] recommended cesarean delivery for pregnant women with prior OASIS with moderate to severe symptoms of anal incontinence and greater than a 1 quadrant (3-hour) defect of the external anal sphincter on endoanal ultrasound. In their study that included 557 women, they found that the majority of women with previous OASI had no symptoms of anal incontinence during subsequent pregnancy and maintained continence after repeat vaginal delivery. They concluded that vaginal delivery is a safe and viable option for these women.

Cassis et al[79] investigated the implications of 6 different decisional algorithms regarding mode of delivery. They applied these algorithms, retrospectively, to a cohort of 233 women with prior OASIs. Based on the observed characteristics of these women, the authors estimated the proportion that would be counseled to undergo planned cesarean delivery in a subsequent delivery (according to each protocol).[79] The cohort underwent extensive assessment including validated symptom questionnaires, anorectal manometry, and endoanal ultrasound. The proportion of women who would be counseled to undergo cesarean delivery varied between 22% and 85% depending on the algorithm applied. These findings highlight an urgent need to optimize and improve algorithms for counseling pregnant women with previous OASIs on mode of delivery.

McKenna et al[80] created an analytical decision model to understand the implications of a policy of recommending routine cesarean delivery for continent women with previous OASI to prevent the development of anal incontinence. Based on this model, they estimated that for every 2.3 cesarean deliveries, 1 case of anal incontinence was prevented. They predicted 11% cesarean morbidity and projected a significant increase in maternal death (relative risk, 2.6; 95% confidence interval, 1.5–4.5). These findings highlight the importance of weighing risks and benefits when choosing mode of delivery for pregnant women with previous OASIs. The majority of pregnant women with prior OASI have no symptoms of anal incontinence.[78] They should be carefully counseled about their future delivery options, and possible risk of repeat OASI should be weighed carefully against possible surgical risk of cesarean delivery.

Summary of Recommendations (All Based on Level III Evidence)

Overall, there are insufficient data to fully counsel women about the impact of surgery for pelvic floor disorders on future pregnancy. In addition, there are insufficient data to assess the definite impact of future pregnancies on the continued effectiveness of prior surgery for pelvic floor disorders. Therefore, women should be presented with the limited available data and invited to participate in shared decision-making. Further prospective studies are needed to guide recommendations

regarding route of delivery for women who become pregnant after surgical treatment for pelvic floor disorders.

Pregnancy and Childbirth After Prior Surgical Treatment for SUI

- Most women who become pregnant after successful surgical treatment of stress incontinence (retropubic urethropexy or MUS procedures) remain continent postpartum.
- Women who become pregnant after midurethral or pubovaginal sling procedures may be at risk of urethral obstruction during pregnancy, possibly presenting during the second trimester.
- For women who become pregnant after surgery for SUI, existing data are not sufficient to establish whether rates of recurrent SUI differ between vaginal versus cesarean delivery.
- In women with congenital anomalies with history of complex reconstructive surgery with or without artificial urinary sphincter, risks of surgical complications at the time of cesarean delivery may outweigh the benefits.

Pregnancy and Childbirth After Implanted SNM Device

- It is currently recommended that SNM devices be turned off during pregnancy. However, urinary symptoms typically worsen when the neuromodulation device is turned off. More data are needed to determine the relative harms and benefits of inactivation of the SNM device during pregnancy. In addition, more data are needed to inform decisions about mode of delivery in pregnant women with an implanted SNM device.

Pregnancy and Childbirth After Prior Surgical Treatment for Pelvic Organ Prolapse

- Among premenopausal women, preoperative counseling before uterine-sparing procedures for prolapse should include a recommendation for effective contraception to prevent unintended pregnancy.
- There are very limited data to estimate the probability of recurrent prolapse after subsequent pregnancy and delivery. Published studies are limited to case reports and small case series, spanning multiple decades.
- Data on safety concerns during pregnancy in women who have undergone surgery for POP also are limited. Among women who have become pregnant after sacral hysteropexy with mesh, there are isolated reports of pain, which has been attributed to tension of the mesh in the third trimester.
- Because of very limited data, it is not possible to make recommendations regarding the mode of delivery after surgery for prolapse.
- After sacral hysteropexy or transvaginal mesh placement, theoretical risks include failure of vaginal and uterine changes necessary to accommodate a pregnancy and vaginal delivery.
- Among women with symptomatic pelvic organ prolapse who have yet to have prolapse repair and who plan future pregnancies but who are unable or unwilling to use a pessary until childbearing is complete, counseling should include a discussion of possible prolapse recurrence after pregnancy and the possible need for cesarean delivery in subsequent deliveries.

Pregnancy and Childbirth After Prior Surgical Repair of Obstetrical Anal Sphincter Injury

- The probability of OASI recurrence in subsequent pregnancies may be as high as 10%, but most studies suggest that the risk of recurrence is similar to the risk of primary OASIs. Although the likelihood of a second OASI is similar to the first, the implications for anal incontinence appear to be considerable.

- Pregnant women with previous OASI should be carefully counseled about mode of delivery options and may be reasonable candidates for a vaginal delivery. Possible risk of repeat OASI should be carefully weighed against possible surgical risk of cesarean delivery.

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Appendix 1

PubMed Search
MeSH terms:
Vagina
pelvic organ prolapse
obstetric anal sphincter injury
stress incontinence
vaginal delivery
pelvic floor
perineum
anal sphincter
Mesh headings:
*Delivery, Obstetric
Postpartum Period", "Pregnancy
Pregnancy Complications
Recurrence
*Suburethral Slings
Urinary Incontinence
Urethra/*surgery
Urinary Bladder/*surgery
Anal Canal/*injuries
Delivery, Obstetrics/*adverse effects
Episiotomy/methods/*statistics & numerical data
Lacerations/*epidemiology/etiology/prevention/ & control
Other text words included in the search:
Sphincter injury
Pubovaginal
TVT
Tension-free vaginal tape