A review of medical and surgical techniques for overcoming cervical stenosis

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Keywords: Cervical stenosis, laminaria, misoprostol

Abstract

Cervical stenosis is anomalous narrowing or obstruction of any part or the entirety of the cervical canal. It may be congenital or acquired as the result of aging, nulliparity, use of progestins, curettage, cervical surgery or any combination of these factors. Cervical stenosis is challenging to gynecologists in that it presents an additional complication to the completion of procedures that require examination of or passage through the cervical canal. Limited literature on overcoming cervical stenosis recommends both medical therapy using laminaria or misoprostol (with additional estrogen therapy in postmenopausal patients) and surgical therapy using a variety of tools including hysteroscope, grasping forceps, scissors, bipolar electrode, hysteroscopic morcellator, resectoscope, LEEP and incision. We present an exemplar case where use of medical therapy might have eliminated the need for or at least reduced the risk of the surgical therapy that the patient actually received. We recommend that gynecologists become familiar with the variety of methods currently in use for resolving cervical stenosis so that they may best advise patients that need such treatment and that medical therapy be attempted before surgical therapy is applied whenever possible.

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Background

Every patient that a physician sees presents a unique representation of human anatomy. Whether due to genetic makeup, accident of birth, over- or under-use of tissues and systems, or damage resulting from injury, disease or medications, each individual demonstrates a certain number of anatomical anomalies. In adult patients, such differences are often asymptomatic, benign and difficult to anticipate. Yet physicians must be prepared for such differences and the complications they present in providing patients with necessary medical treatment. Cervical stenosis is one such anomaly.

Cervical stenosis is defined as cervical scarring of varying degree with narrowing of the cervical canal and/or complete obliteration of the external and

Please cite this paper as: Skopec GS. A review of medical and surgical techniques for overcoming cervical stenosis. Proc Obstet Gynecol. 2018;8(1): Article 1 [7 p.]. Available from: http://ir.uiowa.edu/pog/ Free full text article.

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Financial Disclosure*: The authors report no conflict of interest.*

internal cervical os. It can occur in both pre- and post-menopausal patients, and can be either congenital or acquired. Acquired stenosis (Table 1) can be caused by aging and the accompanying atrophy and lack of estrogen. It may also result from nulliparity, the use of progestins, curettage, or cervical surgeries such as cold knife cone biopsy, cryotherapy or LEEP procedures.[1]

Table 1. Causes of acquired cervical stenosis

Causes of acquired cervical stenosis
1. Aging
2. Nulliparity
3. Use of progestins
4. Curettage
5. Cervical surgery

Cervical stenosis is challenging to gynecologists in that it presents an additional complication when performing procedures that require cervical dilation and/or access to the endometrial cavity, including hysteroscopy, embryo transfer, IUD placement, and dilation and curettage.

Table 2. Procedural complications resulting from cervical stenosis

1. Uterine perforation
2. Cervical laceration
3. False tract
4. Scarring
5. Unsuccessful procedure

In fact, 47% of failed hysteroscopies and 50% of entry-related hysteroscopy complications can be directly related to cervical stenosis.[1] Furthermore, cervical stenosis can lead to a variety of procedural complications that can be difficult to anticipate (Table 2).

Case Report

In clinical settings, it is often the case that neither the physician nor the patient is aware of a cervical stenosis. Rather it is discovered in the process of performing another necessary procedure. Thus, for example, a simple endometrial biopsy may result in a surgical procedure to resolve the cervical stenosis and complete the sampling. Consider the following case.

A 56-year-old, nulliparous woman presented with an episode of postmenopausal bleeding. The patient had been postmenopausal since age 53 and had no history of hormone replacement therapy. She did have a history of polycystic ovarian syndrome and underwent cold-knife cone and laser ablation for cervical and vaginal dysplasia ten years previous. Examination by ultrasound was normal except for a 7 mm endometrial stripe rather than the anticipated 3 mm stripe. Pelvic exam showed an atrophic vagina. The cervix was flush with the vagina and there was no obvious cervical os.

The patient was originally seen in the Obstetrics and Gynecology clinic of a university-affiliated, tertiary-care hospital. An attempt for endometrial biopsy was made in office, but was unsuccessful due to cervical stenosis. As a result, the patient was scheduled for resolution of the stenosis in the facility's ambulatory surgical clinic, where surgery was attempted with incision of the external cervical os and ultrasound-guided dilation and biopsy. Biopsy yielded path-fibroadipose tissue, but no endometrium was identified. The patient elected to have ultrasound surveillance of her endometrium.

The above case illustrates the difficulties cervical stenosis can cause in obtaining an adequate biopsy. This article will outline some techniques that may be used to overcome such barriers. Clearly, resolution of cervical stenosis is problematic for patients and physicians alike. Unexpected delays resulting from rescheduling for surgery, recovery from surgery, resolution of surgical complications and subsequent follow-up can be frustrating. More importantly, the time lost to delays could be critical when the patients' original problems are dangerous (e.g., cancer) or urgent (e.g., IUD placement).

Overcoming cervical stenosis

Overall, literature on overcoming cervical stenosis is sparse and mostly anecdotal. Resolution may require medical therapy, surgical management or both prior to the procedure for which the patient was originally scheduled. Generally, the more extensive the stenosis is, the more likely that it will need to be resolved surgically rather than medically.

For purposes of identifying the best method of resolution, cervical stenosis can be classified in the following manner:

Table 3. Type and location of cervical stenosis[1]

Type	Location of cervical stenosis
Type 1	stenosis of the external os
Type 2	stenosis of the distal third of the cervical canal and internal os
Type 3	stenosis of the internal os
Type 4	combined stenosis of the external and internal os

The type of cervical stenosis can be difficult to determine prior to dilation. For example, only Type 1 stenosis can regularly be identified on speculum exam.

<u>Medical therapy for overcoming cervical stenosis</u>

Medical therapy using osmotic dilators or cervical ripening agents to overcome cervical stenosis may be useful for avoiding surgery and its potential complications.

Osmotic dilators such as laminaria offer one possible solution for women with Type 3 or Type 4 cervical stenosis. However, their placement requires an additional office visit, and the laminaria may cause the patient some discomfort after placement.

Cervical ripening agents are also commonly used for women with cervical stenosis. The most commonly used agent is misoprostol (trade name "Cytotec"), which is a prostaglandin E1 analog. Misoprostol binds to myometrial cells causing contractions. It also binds to prostaglandin E2 receptors causing softening and dilation of the cervix.

Typically, a 200mcg dose is given the night before and morning of the procedure. While misoprostol may cause pain and vaginal bleeding, patients appear to prefer these complications to the discomfort, cost and additional office time required for the use of laminaria. Furthermore, literature indicates that use of misoprostol may not always be simple or straightforward.

In 2004, Darwish conducted a study involving 144 randomized patients who were treated with either laminaria or misoprostol. This study found no statistical difference between the two groups, suggesting that both are equally effective. However, patients preferred misoprostol, citing both the cost and the difficulty of placement as disadvantages to the use of laminaria.[2]

Table 4. Surgical procedures to manage cervical stenosis

Cervical stenosis Types 2,3 and 4	
Rotation of the hysteroscope	Slowly rotate the scope to gently break down mild adhesions. Then advance the scope into the uterine cavity.[7]
Forceps	Using grasping forceps, gently spread the tips to break down adhesions and to gain access to the cavity.[1]
Scissors	Use scissors to incise tissue at 3-6-9 o'clock at the level of the internal cervical os to overcome the stenosis.[1]
Bipolar electrode	Use a bipolar electrode to incise tissue in the same fashion as with the scissors.[1] This technique allowed for easy and atraumatic post-operative embryo transfer in the post-operative IVF cycle in all 13 patients that were followed.[8]
Hysteroscopic morcellator	Use a guidewire passed into the uterine cavity followed by a morcellator to resect stenotic tissue at 4 and 8 o'clock to avoid lateral vessels.[9]
Resectoscope	No description of procedure given.[7]

Cervical stenosis Type 1 stenosis	
LEEP procedure	Can be helpful when the canal cannot be identified.[1]
Scalpel with an 11 blade	Incise at the dimple of the external os. This technique is beneficial for women with scarring and can allow dilation with the mini Pratt dilators. (3 to 5 mm).[1]

Thus, misoprostol may be more beneficial for certain patients. In 2008, Oppegaard reported on the results of a randomized double-blind, placebo-controlled trial showing that preoperative misoprostol was effective for cervical dilation in premenopausal women, but not in postmenopausal women.[3] However, in 2010, the same author reported that vaginal misoprostol can also be effective in postmenopausal women if its administration is preceded by a 14-day course of vaginal estrogen.[4]

In 2015, Cochrane reviewed 19 randomized, controlled trials involving 1,870 patients that used either laminaria or misoprostol. The outcomes of these trials showed that misoprostol was more effective than placebo, dinoprostone or no treatment. Conversely, laminaria were more effective than misoprostol, but the benefits of their use had to be weighed against the inconvenience and discomfort of insertion.[5]

More recently, Casadei, et al., looked at the efficacy of pretreatment with vaginal estrogen for postmenopausal women using vaginal misoprostol to resolve cervical stenosis. Patients received 25 mcg of estradiol vaginally for 14 days followed by 400 mcg of misoprostol 12 hours prior to their procedure. This course showed a statistically significant increase in dilation (5.7 mm vs. 4.7 mm). Furthermore, study participants underwent easier dilation and reported lower pain scores.[6]

Surgical management of cervical stenosis

Generally, literature on surgical resolution of cervical stenosis consists of small-scale retrospective studies and anecdotal case reports. Most frequently, scissors, forceps, bipolar electrodes, resectoscopes and hysteroscopic morcellators have been used (Table 4), each with varying levels of success (Table 5).

In one large-scale study, Bettocchi et al. followed 10,158 patients undergoing hysteroscopies who had cervical stenoses resolved using forceps, scissors or bipolar electrodes. In these cases, successful entry was gained in 98.5%, with only 1.5% requiring ultrasound guidance. Bettocchi et al. offer a video that demonstrates the surgical interventions they describe.[1]

Table 5. Success rates for surgical resolution of cervical stenosis by surgical tool used.[1]

Surgical Tool	Success rate
Rotation of hysteroscope	31%
Forceps	26-52%
Scissors	22-32.8%
Bipolar electrode	5.8-20.6 %

Overall, surgical management of cervical stenosis can be managed by hysteroscopic methods or conversely managed using ultrasound guidance during cervical dilation as described above. This important step helps to prevent a false tract or uterine perforation. Using ultrasound guidance is also very helpful in the placement of IUD's for women with anteflexed or retroflexed uterus.

Comparative success rates have not been determined for resolutions by morcellator, resectoscope or LEEP, but Lin et al. report only one failed entry in 30 procedures performed using a resectoscope.[7]

Discussion

With greater knowledge of risk factors (Table 1) for anatomical anomalies such as cervical stenosis, gynecologists can better anticipate such problems, and identify and employ optimal methods for resolving them in women undergoing gynecological procedures. However, there is no one simple, "one-size-fits-all" solution for overcoming cervical stenosis. Gynecologists need to consider the location and the extent of the stenosis, as well as the age, parity, use of hormone therapy, level of pain tolerance and surgical history of the patient in determining a best course of action. In addition, factors such as the availability of the patient, physician, and treatment facilities and tools as well as the patient's allergies and tolerance to medications need to be considered.

Medical therapy may allow cervical stenosis to be resolved without surgical intervention, especially for Type 3 and 4 stenoses (Table 3). Laminaria are a highly effective choice, but they are unpopular with patients. For premenopausal patients, use of misoprostol may be nearly as effective and may cause less discomfort and inconvenience than laminaria insertion. For postmenopausal women, on the other hand, use of misoprostol is complicated by the need for a preceding, two-week course of topical estrogen. Nevertheless, these therapies may resolve stenoses completely, or will at least better prepare a patient for a surgical resolution, as might have been the case for the nulliparous, postmenopausal, patient with a history of multiple surgical procedures described above.

Knowledge of multiple surgical methods for overcoming cervical stenosis gives surgeons more options that may allow for a larger number of successful resolutions for a greater variety of cases. Again, the choice of methods is dependent on the location and extent of the stenosis. For example, while scissors might work well for a Type 1 (external os) stenoses (Table 3), they would be clearly ineffectual for Type 3 (internal os) stenoses. Furthermore, although the use of spreading forceps appears to have slightly greater success in the resolution of cases that have been studied, it is likely that the "best" choice for any physician depends on the availability of the tools described above and each individual physician's experience with them.

In addition, while addressed in Bettocchi's videotape, we feel that the extent and location of a cervical stenosis can best be determined with hysteroscopic or ultrasound guidance.[1] Ultrasound is most effective when the patient has a full bladder, allowing an ultrasonic window to improve visualization. It is, further, imperative to have an experienced ultrasound technician so that the image will stay on plane when dilating the cervix. Finally, to ensure best outcomes, cervical procedures in patients fulfilling the risk factors for cervical stenosis should be performed in a hospital setting with access to a procedure suite and/or an operating room with facilities for overnight observation as needed.

Conclusion

Overall, best medical practices suggest that, whenever possible, resolution of cervical stenosis should begin with medical therapy. In some cases, the medical therapy alone may lead to resolution of the stenosis. If not, the dilation of normal cervical tissue resulting from medical therapy will allow the surgeon to use less force during mechanical dilation and placement of the hysteroscope in the cervical canal when verifying the location and extent of the stenosis, and, as a result, choose the best tool to overcome the stenosis while reducing the risk of additional surgical complications. Furthermore, surgical familiarity with a variety of tools for overcoming cervical stenosis, gives the surgeon a greater opportunity for successful resolution with minimal surgical complications.

References

1. Bettocchi S, Bramante S, Bifulco G, Spinelli M, Ceci O, Fascilla FD, Di Spiezio Sardo A. Challenging the cervix: strategies to overcome the anatomic impediments to hysteroscopy: analysis of 31,052 office hysteroscopies. Fertil Steril. 2016 May;105(5):e16-e17. https://doi.org/10.1016/j.fertnstert.2016.01.030 Epub 2016 Feb 9. PubMed PMID: 26873675.

2. Darwish AM, Ahmad AM, Mohammad AM. Cervical priming prior to operative hysteroscopy: a randomized comparison of laminaria versus misoprostol. Hum Reprod. 2004 Oct;19(10):2391-4. https://doi.org/10.1093/humrep/deh397 Epub 2004 Aug 27. PubMed PMID: 15333607.

3. Oppegaard KS, Nesheim BI, Istre O, Qvigstad E. Comparison of self-administered vaginal misoprostol versus placebo for cervical ripening prior to operative hysteroscopy using a sequential trial design. BJOG. 2008 Apr;115(5):663, e1-9. https://doi.org/10.1111/j.1471-0528.2007.01628.x Epub 2008 Jan 16. PubMed PMID: 18201279;PubMed Central PMCID: PMC2345467.

4. Oppegaard KS, Lieng M, Berg A, Istre O, Qvigstad E, Nesheim BI. A combination of misoprostol and estradiol for preoperative cervical ripening in postmenopausal women: a randomised controlled trial. BJOG. 2010 Jan;117(1):53-61. https://doi.org/10.1111/j.1471-0528.2009.02435.x PubMed PMID: 20002369; PubMed Central PMCID: PMC2805871.

5. Al-Fozan H, Firwana B, Al Kadri H, Hassan S, Tulandi T. Preoperative ripening of the cervix before operative hysteroscopy. Cochrane Database Syst Rev. 2015 Apr 23;(4):CD005998. https://doi.org/10.1002/14651858.CD005998.pub2 PubMed PMID: 25906113.

6. Casadei L, Piccolo E, Manicuti C, Cardinale S, Collamarini M, Piccione E. Role of vaginal estradiol pretreatment combined with vaginal misoprostol for cervical ripening before operative hysteroscopy in postmenopausal women. Obstet Gynecol Sci. 2016 May;59(3):220-6. https://doi.org/10.5468/ogs.2016.59.3.220 Epub 2016 May 13. PubMed PMID: 27200313; PubMed Central PMCID: PMC4871939.

7. Lin YH, Hwang JL, Huang LW, Seow KM, Chen HJ, Tzeng CR. Efficacy of hysteroscopic cervical resection for cervical stenosis. J Minim Invasive Gynecol. 2013 Nov-Dec;20(6):836-41. https://doi.org/10.1016/j.jmig.2013.04.026 PubMed PMID: 24183274.

8. Mahajan N, Gupta I. Use of Versapoint to refashion the cervical canal to overcome unusually difficult embryo transfers and improve in-vitro fertilization-embryo transfer outcome: A case series. J Hum Reprod Sci. 2011 Jan;4(1):12-6. https://doi.org/10.4103/0974-1208.82353 PubMed PMID: 21772733; PubMedCentral PMCID: PMC3136061.

9. Salari BW, Bhagavath B, Galloway ML, Findley AD, Yaklic JL, Lindheim SR. Hysteroscopic morcellator to overcome cervical stenosis. Fertil Steril. 2016 Nov;106(6):e12-e13. https://doi.org/10.1016/j.fertnstert.2016.07.1091 Epub 2016 Aug 16. PubMed PMID: 27542706.