

Retained Intrauterine Bony Fragments as a Cause of Secondary Infertility in a Tertiary Level Indian Hospital

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ABSTRACT

Background: Midtrimester surgical abortions often result in retained intrauterine fetal bones and consequent secondary infertility. **Aim:** To study the incidence of women presenting with retained intrauterine bones as a cause of secondary infertility in a tertiary level Indian hospital and pregnancy rates following retrieval of these fragments. **Setting and Design:** Retrospective data analysis in the infertility clinic of PGIMER (Post Graduate Institute of Medical Education and Research), a tertiary level hospital of Northern India. **Materials and Methods:** Women diagnosed with retained intrauterine bony fragments were subjected to hysteroscopic removal of these fragments. Incidentally diagnosed retained bones on hysteroscopy were also removed. Such women were followed for spontaneous resumption of fertility or were subjected to ovulation induction, and pregnancy rates were noted. **Results:** Retained fetal bones accounted for 0.28% of all women with infertility and 12% (22/144) of all the uterine causes of infertility requiring an operative hysteroscopic procedure for treatment. Only 5 (27.7%) of 18 women conceived after the hysteroscopic retrieval of bony fragments: three had full-term vaginal deliveries, one had a midtrimester abortion, and one woman is in her third trimester. **Conclusion:** Despite surgical retrieval, fertility rates may be lower due to inflammatory damage to the endometrium.

KEYWORDS: Fetal bone, hysteroscopy, operative, secondary infertility

INTRODUCTION

Retained intrauterine bony fragments are a very rare entity, often underdiagnosed^[1] with the reported incidence of 0.15% among diagnostic hysteroscopies.^[2] The most common cause of retained intrauterine bony fragments is those of fetal bones after an abortion.^[3] Other rare causes are osseous metaplasia, dystrophic calcification of the endometrium, and heteroplasia secondary to hypercalcemia, hyperphosphatemia, and hypervitaminosis D. Retained intrauterine bones usually present with gynecological problems such as infertility, menstrual irregularities, dysmenorrhea, vaginal discharge, and chronic pelvic pain. At times, they may be incidentally diagnosed on a sonogram or hysteroscopy. The history of midtrimester abortions is often not revealed when done illegally and is usually obtained retrospectively after diagnosing retained intrauterine bony fragments. There is a lack of data from the developing countries where the incidence of illegal

midtrimester abortions is high. Retained intrauterine bones have a deleterious impact on the endometrium and lead to infertility by causing mechanical obstruction in the endometrial cavity, inflammatory effect by acting as a foreign body, and have direct embryo toxicity due to osseous particles. Removal of such fragments may resume the fertility, but prolonged retention may cause endometrial atrophy and adhesions which may not lead to improvement of fertility despite removal and use of assisted reproductive techniques. This study was planned to find the incidence of retained intrauterine fetal bones leading to infertility and the fertility resumption after their removal. Although there is a reported high rate of fertility after retrieval, long-standing bone retention

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in the uterus may lead to chronic inflammation and endometrial damage which may not improve the fertility rates.

MATERIALS AND METHODS

Data from the infertility clinic of the Post Graduate Institute of Medical Education and Research (PGIMER) over a 6-year period (January 2009–December 2014) were retrospectively reviewed. Women with an isolated uterine factor for infertility (intrauterine septum, intrauterine adhesions, submucous myomas, endometrial polyps, and retained fetal bones) were identified. Among these, the subgroup of women who underwent operative hysteroscopy for retained intrauterine fetal bones was selected. Diagnosis of retained intrauterine bony fragments in such women was provisionally made on the basis of pelvic sonogram, suggestive of retained intrauterine bony fragments, and this was confirmed after hysteroscopy. Women with incidentally diagnosed retained bony fragments on hysteroscopy (with no suggestive history and a normal pelvic sonogram) were also included and were followed up for resumption of fertility after their hysteroscopic removal. These women were kept on follow-up for 6 years to observe their fertility rates (both spontaneous as well as after treatment). Approval from the institutional review board was not sought as women were not subjected to any other interventions apart from the standard treatment protocol for infertility.

RESULTS

Overall, the incidence of retained intrauterine fetal bones alone as a cause of infertility among all women registered in the infertility clinic from 2009 to 2014 was 18/6435 or 0.28%.

Over 6 years, 144 women underwent an operative hysteroscopic procedure for an isolated uterine factor for infertility. Retained fetal bone as a cause of secondary infertility was identified among 22 women, of these 18 had no other attributable cause of infertility,

making the incidence to be 12%. The characteristics of these women are outlined in Table 1.

Incidental diagnosis of fetal bone was made in more than half (12/18) of these women. Pelvic ultrasound picked up 17/18 of the retained bones during routine scanning for infertility. In one case, bones were incidentally seen during routine hysteroscopy. On retrospective analysis, 11/18 women were found to have some menstrual abnormality following abortion.

All these women were subjected to hysteroscopy which was diagnostic in all and operative in 15/18 (83.3%). Remaining three women underwent removal of the bony fragments by curettage after a diagnostic hysteroscopy. Various instruments used were long artery forceps and polyp forceps, and in one case, because the bones seemed embedded, they were hooked in the diathermy loop and pulled out. The number of recovered bones varied from one to a maximum number of thirty [Figures 1-4]. All the recovered fragments were proven to be bony on histological analysis. However, despite thorough check made after hysteroscopy, follow-up ultrasound scan showed the presence of echogenic specks in the endometrium, suggestive of incomplete or missed bone chips after hysteroscopy in eight women probably to suggest they were too small or deeply embedded that they were not visualized at the time of hysteroscopy.

These women were kept on follow-up after bone retrieval anticipating spontaneous recovery of fertility as all of them had no other causes for infertility. Maximum follow-up data are available for 12 women up to a period of 6 years. Spontaneous conception after removal of bony fragments was noted in only five women: three conceived after ovulation induction and two conceived spontaneously. There were three full-term deliveries, one midtrimester abortion and one has an ongoing pregnancy

Table 1: Presenting features of women with secondary infertility due to retained intrauterine bones

Presentation	Number of women
Antecedent abortion	Second trimester: 13 First trimester: 5
Secondary infertility	<2 years: 5 2-3 years: 6 >3 years: 7
Menstrual symptoms	Menorrhagia: 5 Hypo/amenorrhoea: 2 Metrorrhagia: 4
Chronic pelvic pain	2

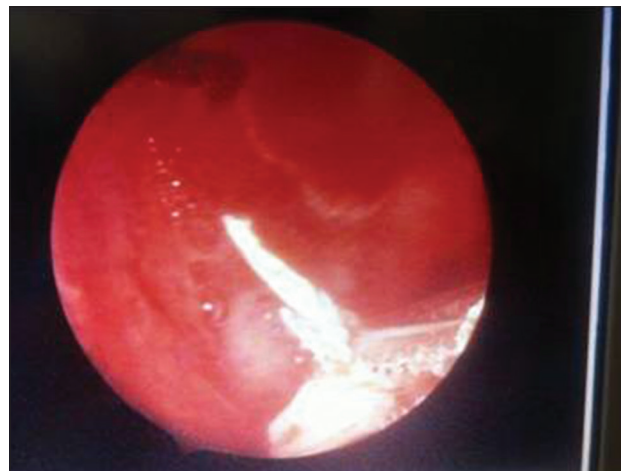


Figure 1: Coral-like appearance of retained intrauterine bones

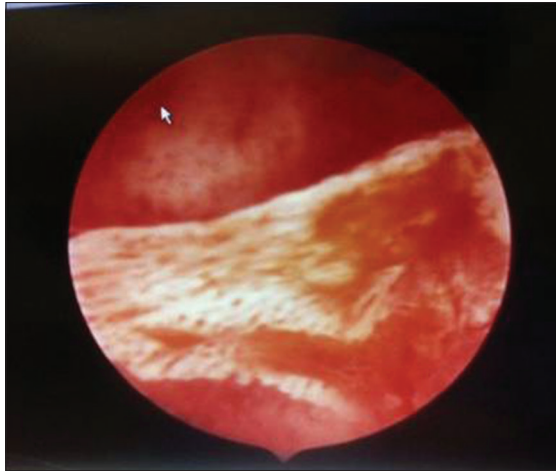


Figure 2: Hysteroscopic view of retained intrauterine bones

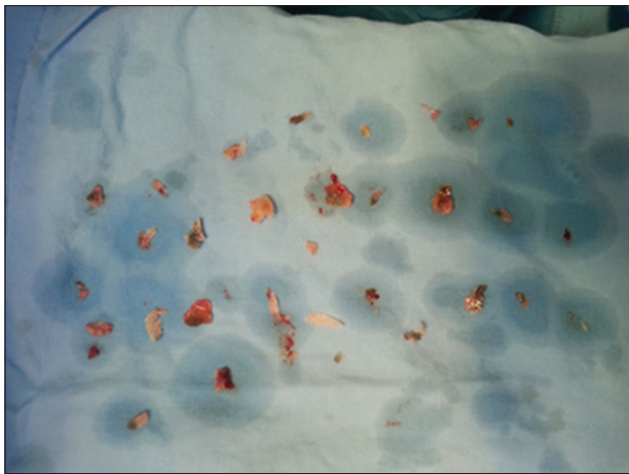


Figure 3: Hysteroscopically retrieved intrauterine fetal bones



Figure 4: Hysteroscopically retrieved intrauterine fetal bones

in the third trimester. These women had no residual bony fragments after hysteroscopic retrieval and the duration of secondary infertility after the midtrimester abortion was <3 years. In all women with long-standing secondary

infertility (>3 years), there no resumption of fertility despite hysteroscopic removal of these fragments [Table 1].

DISCUSSION

Majority of the patients with retained intrauterine bones have an antecedent history of induced abortion or curettage. First-trimester abortions where fetal bone ossification has not completely occurred lead to intrauterine bone formation by dystrophic calcification of retained products. Midtrimester abortions often require instrumentation and cause retention of the skull bones of the fetal head due to detachment.^[4] The incidence is more in anomalous uteri.^[1] In developing countries like India, where illegal midtrimester abortions are still rampant, the incidence of retained bony products is expected to be higher. Most women do not give a history of past abortion as it is concealed or considered unimportant by women. The incidence of retained bones as a cause of infertility in this review is therefore higher compared to Makris *et al.*^[2]

Bone formation may also be attributed to chronic endometritis and resulting osseous metaplasia of the endometrium.^[5,6] Retained bones following abortion may be distinguished from this osseous metaplasia by the presence of tissue reaction^[5] and endochondral ossification. Metaplastic ossification of the endometrium following chronic inflammation affects it diffusely. A history of antecedent pregnancy or abortion may be absent. The endometrial stromal cells have an inherent capacity to undergo heteroplasia and heterotrophic bone formation within the uterus. Rare causes of endometrial calcification are hypercalcemia, hyperphosphatemia, and hypervitaminosis D.

The sequelae of retained fetal bone are chronic pelvic pain and menstrual abnormalities such as metrorrhagia, menorrhagia, pelvic inflammatory disease, and secondary infertility.^[7]

Although the exact mechanism of infertility in retained bones is not clearly known, the postulated reasons are those of the fetal bone acting as an intrauterine device, by blocking implantation of the blastocyst and through creation of sterile inflammatory reaction which is spermicidal. The increase in the level of prostaglandins may also be associated with pelvic pain and dysmenorrhea.^[8] If the foreign body is removed quickly, these changes are expected to regress with a return of fertility, provided there is no tubal damage and synechial formation after the abortion.

Retained fetal bones can be accurately diagnosed only on hysteroscopy. Earlier, diagnosis was incidental, often on hysterectomy specimens or due to the grittiness

encountered during curettages for abnormal uterine bleeding. The radiologists usually report them as calcified specs in the endometrium or presence of calcification in the endometrium.^[9] Such findings should raise suspicion of retained bones and a retrospective history often confirms the suspicion. In our analysis, 60% women did not reveal the history on initial evaluation.

Preoperative estimation of these shadows on the ultrasonogram guides in the hysteroscopic removal by giving an idea of the number of bony fragments expected to be removed. Hysterosalpingogram may reveal filling defects of the uterine cavity. Hysteroscopy reveals coral-like osseous fragments embedded within or projecting through the endometrium [Figure 1] and confirms the diagnosis. These can be successfully retrieved through a resectoscope or through a sponge forceps. Curettage has also been tried for retrieval.

Removal of bony fragments by hysteroscopy is associated with therapeutic success and correction of infertility, as reported in the literature.^[4,10-18] Khan *et al.* reported a spontaneous pregnancy rate of around 80% in one of the largest reviews on retained bones,^[17] most of the pregnancies occurring 6 months after bone retrieval. Our pregnancy results were not as high as majority of the women (7/18) had long-standing secondary infertility (>3 years) [Table 1]. Possible explanations could be endometritis due to long-term presence of a foreign body in the endometrial cavity. The second reason to explain it is that few bone fragments get deeply embedded which escape removal and continue to act as foreign bodies preventing intrauterine pregnancy. As rightly pointed out by Lopata *et al.*, the inability of the endometrium to permit embedding retention and development of the embryo may be one cause of failure of implantation even after *in vitro* fertilization (IVF) for curing infertility due to retained bones.^[19]

CONCLUSION

The incidence of retained intrauterine bony fragments is higher in developing countries like India where the incidence of illegal midtrimester abortions was higher in the past. Often these are incidentally diagnosed and retrospective history of abortion is obtained. Spontaneous recovery of fertility may occur following retrieval of these fragments, but prolonged retention can lead to endometrial inflammatory damage and IVF failure.

With the popularity of medical methods of abortion and their early use, the incidence of retained intrauterine bones and consequent infertility may reduce in the future. Use of Dilatation and Evacuation must be

avoided for second-trimester abortions and a high index of suspicion must be made for retained intrauterine bones if infertility ensues after the procedure.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

- Melius FA, Julian TM, Nagel TC. Prolonged retention of intrauterine bones. *Obstet Gynecol* 1991;78:919-21.
- Makris N, Stefanidis K, Loutradis D, Anastasiadou K, Hatjipappas G, Antsaklis A, *et al.* The incidence of retained fetal bone revealed in 2000 diagnostic hysteroscopies. *JSL* 2006;10:76-7.
- Rådestad A, Flam F. Intrauterine retention of fetal bones after abortion. *Acta Obstet Gynecol Scand* 1995;74:662-4.
- Moon HS, Park YH, Kwon HY, Hong SH, Kim SK. Iatrogenic secondary infertility caused by residual intrauterine fetal bone after midtrimester abortion. *Am J Obstet Gynecol* 1997;176:369-70.
- Acharya U, Pinion SB, Parkin DE, Hamilton MP. Osseous metaplasia of the endometrium treated by hysteroscopic resection. *Br J Obstet Gynaecol* 1993;100:391-2.
- Roth E, Taylor HB. Heterotopic cartilage in the uterus. *Obstet Gynecol* 1966;27:838-44.
- Chervenak FA, Amin HK, Neuwirth RS. Symptomatic intrauterine retention of fetal bones. *Obstet Gynecol* 1982;59:58S-61S.
- Lewis V, Khan-Dawood F, King M, Beckmann C, Dawood MY. Retention of intrauterine fetal bone increases menstrual prostaglandins. *Obstet Gynecol* 1990;75:561-3.
- Dawood MY, Jarrett JC 2nd. Prolonged intrauterine retention of fetal bones after abortion causing infertility. *Am J Obstet Gynecol* 1982;143:715-7.
- Kimberly E, Claman P. Novel treatment of a patient with secondary infertility due to retained foetal bone. *FertilSteril* 2003;79:1028-30.
- Van den Bosch T, Dubin M, Cornelis A. Favorable pregnancy outcome in a woman with osseous metaplasia of the uterus. *Ultrasound Obstet Gynecol* 2000;15:445-6.
- Marcus SF, Bhattacharya J, Williams G, Brinsden P, Hamou J. Endometrial ossification: A cause of secondary infertility. Report of two cases. *Am J Obstet Gynecol* 1994;170:1381-3.
- Graham O, Cheng LC, Parsons JH. The ultrasound diagnosis of retained fetal bones in West African patients complaining of infertility. *BJOG* 2000;107:122-4.
- Usha Kiran TS, Bhal PS. The potential consequence of early recognition and treatment of retained fetal bony fragments. *J Obstet Gynaecol* 2002;22:443-4.
- Goldberg JM, Roberts S. Restoration of fertility after hysteroscopic removal of intrauterine bone fragments. *Obstet Gynecol* 2008;112:470-2.
- Winkelman WD, Frates MC, Fox JH, Ginsburg ES, Srouji S. Secondary infertility and retained fetal bone fragments. *Obstet Gynecol* 2013;122:458-61.

17. Khan SN, Modi M, Hoyos LR, Imudia AN, Awonuga AO. Bone in the endometrium: A Review. *Int J Fertil Steril* 2016;10:154-61.
18. Pereira MC, Vaz MM, Miranda SP, Araújo SR, Menezes DB, das Chagas Medeiros F, *et al.* Uterine cavity calcifications: A report of 7 cases and a systematic literature review. *J Minim Invasive Gynecol* 2014;21:346-52.
19. Lopata A, Martin M, Oliva K, Johnston I. Embryonic development and blastocyst implantation following *in vitro* fertilization and embryo transfer. *Fertil Steril* 1982;38:682-7.