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CASE REPORT OPEN ACCESS

When Hysteroscopy is the only way out; a case series of endometrial osseous metaplasia

Hysteroscopy is best for endometrial bone retrieval

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Abstract
Background: Endometrial osseous metaplasia (EOM) poses diagnostic and treatment dilemmas. Hysteroscopy is the gold standard in the diagnosis of endometrial pathologies and offers optimal treatment for osseous metaplasia.
Case presentation: Five new cases of EOM were diagnosed within four years, giving an annual incidence of 5/101 (1.24%) of hysteroscopies and 5/583 (0.21%) of gynaecological surgeries.
The patients' mean age was 35.2 ± 10.0 years. The diagnosis was made in all cases during evaluation for infertility with the duration of infertility ranging from 1-14years. They all had a preceding pregnancy termination.
All of the five patients had recurrent vaginal discharge, with durations ranging from 1-23 years. Bone tissue was retrieved from the endometrium in all cases, a long bone was impacted in a cephalo-caudal direction in one of the patients, requiring initial cephalad dislodgement before retrieval. After resection, the vaginal discharge stopped immediately and one of the patients conceived spontaneously and had a term delivery.
Conclusion: EOM can best be diagnosed and treated by hysteroscopy. It is mostly preceded by pregnancy termination; with a mid-trimester dilatation and evacuation as the commonest risk factor. The indolent nature of the associated vaginal discharge makes EOM predominantly diagnosed during evaluation for infertility.

Keywords: Abortion, bone, endometrium, hysteroscopy, infertility

Background

The first description of osteogenesis within the female genital tract was given by De Brux et al in 1956 (1). Endometrial ossification, may not be as uncommon as earlier thought seven decades ago, because of the increasing use of hysteroscopy in the evaluation of infertile patients (2, 3, 4, 5, 6, 7). EOM is a condition which manifests as the presence of bone tissue within the endometrial cavity (8).

It has been often reported to follow an abortion process and is often associated with infertility (2, 3, 8, 9). While all the other factors for infertility can be readily bye-passed and overcome by IVF; endometrial factors including EOM causing infertility may be difficult to manage and surrogates may be required when an endometrial factor is untreatable and IVF is considered.

The commonly held theories of the onset of EOM include retention of foetal bone after an abortion, with continued proliferation. Retained foetal bones have also been postulated to excite varying degrees of non-specific chronic inflammation with superimposed calcification (5, 6, 8). Other reported descriptions include endometrial curettage resulting in de-novo osseous transformation and calcification from chronic endometritis since the labile cells of the

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endometrial mesenchyme also have pluripotent potential (2, 8, 9). Endometrial ossification has however been reported in an individual without a history of endometrial instrumentation, pregnancy or abortion, suggesting a pathogenesis of the very rare dystrophic calcification (6).

Hysteroscopic evaluation before IVF is becoming popular in many settings of Sub-Saharan Africa, where incidentally also, induced abortion methods may be varied and unsafe abortion rife (10). The increasing use of hysteroscopy and increasing associations of EOM with second-trimester pregnancy terminations raise questions about the methods used in these settings and may unearth a rare long-term complication of unsafe abortion. Hysteroscopy is the most important modality for the diagnosis and effective treatment of endometrial factors implicated in infertility (2, 3, 5, 7). The need for data to buttress the pathogenesis and highlight the importance of hysteroscopy in the diagnosis and optimal treatment of this condition is therefore imperative. We present a series of five patients with EOM diagnosed with hysteroscopy during infertility evaluation, one of whom had a long bone impacted in a cephalo-caudal direction within the endometrium, requiring cephalad dislodgement before retrieval.

Case Presentation

In the four years, there were 583 gynaecological procedures, out of which 101 were hysteroscopies. Endometrial osseous metaplasia was diagnosed and treated by hysteroscopy in five patients, giving an annual incidence of 5/101 (1.24%) or 12.4/1000 hysteroscopies or 5/583 (0.21%) or 2.14/1000 gynaecological surgeries. Hysteroscopy was done in all the patients with a 30˚ telescope within a 4-channel operating sheath and normal saline as the distension medium. After case identification, the other details of the patient data were retrieved from the case files in the records department and the histopathology reports from the histopathology department.

The mean age of the patients was 35.2 ± 10.0 years. All the patients were married, three (60%) completed tertiary level education, and four (80%), resided outside Ogun state where the endoscopic health facility was located. None of the patients had features suggestive of chronic debilitating or immunosuppressive illness (Table 1). All the cases were detected during evaluation for secondary infertility, two (40%) were undergoing work-up for repeat IVF. The duration of infertility ranged from 1-14 years.

Table 1 Sociodemographic characteristics of the patients

Characteristics	Frequency	Percentage
Age (mean ± SD) years	35.2 ± 10.0	
Currently married		
Yes	5	100.0
No	0	0
Highest Educational level		
Secondary	2	40.0
Tertiary	3	60.0
Residence		
Outside Ogun state	4	80.0
Within Ogun state	1	20.0
BMI		
18-24.9	4	80.0
25-29.9	1	20.0
Undergoing infertility evaluation	5	100.0
Length of infertility	Range: 1-14 years	
Pre-IVF work up	2	40.0
Previous IVF	2	40.0
Parity		
0	4	80.0
1	1	20.0
Type of pregnancy loss		
IUFD	1	20.0
Induced abortion	4	80.0
Range of GA at pregnancy loss (n=5)	Range = 13-28 weeks	
Method of uterine evacuation		
MVA	1	20.0
Dilatation and evacuation	4	80.0
Repeat evacuation (s)	5	100.0

Method of repeat evacuation		
*MVA	2	40.0
Dilatation and curettage	5	100.0
Dilatation and evacuation	3	60.0

*Some of the patients had a repeat evacuation using MVA, first before the other two methods

All of the five patients had a preceding pregnancy, four had induced abortion while one had an intrauterine foetal demise at 28 weeks gestation. The gestational age for induced abortion ranged from 13-24 weeks, dilatation and evacuation was the method of initial uterine evacuation done in 4/5 (80%), while manual vacuum aspiration (MVA) was done in one. All five patients had repeat uterine evacuations due to continued uterine bleeding, three had repeat D&E, while 2 had MVA, and these were followed later in all five patients by dilatation and curettage (D&C) (table 1).

All five patients had vaginal discharge which was copious, foul-smelling and recurrent. The duration of this discharge ranged from 1-23 years while the interval from pregnancy termination to onset of the discharge ranged from 2-3 weeks. An earlier 3-D ultrasound scanning in 2 patients revealed features of an endometrial foreign body. The other three patients had incidental findings during fertility evaluation with hysteroscopy. All of the five patients had used antibiotics repeatedly both by prescription and over-the-counter. Symptoms, however, recurred in all the cases and within 2-3 weeks of antibiotic use (Table 2).

Table 2 Clinical presentation

Feature	Frequency	Percentage
Symptoms (vaginal discharge, n=5)		
Copious	5	100.0
Foul-smelling	5	100.0
Cloudy	5	100.0
Recurrent	5	100.0
Prior diagnosis before hysteroscopy	2	40.0
Mode of prior diagnosis of EOM (USS)	2	40.0
Remedies applied (antibiotics)	5	100.0
Outcome of remedies	5	100.0
Temporary relief of discharge	5	100.0
Recurrence of vaginal discharge	5	100.0
Relief-recurrence interval (2-3 weeks)	5	100.0

All the patients had hysteroscopic resection of osseous material; three patients also had diagnostic laparoscopy in addition. Bone tissue was retrieved from the endometrium in all cases; with foetal long bone alone in 2, long and flat bone in 2 and only flat bones in one. All the patients had hard easy-to-grasp bone tissue admixed with sheets of easily dislodged, but fragmented tissue. One long bone was impacted in a cephalo-caudal direction in one of the patients, requiring cephalad dislodgement with a hysteroscopy grasper before retrieval.

Histology revealed features consistent with bone mesenchymal tissue core and surrounding chronic inflammatory cells in all cases, while evidence of dystrophic calcification was found around the tissue periphery in four of the patients. After resection, the vaginal discharge stopped immediately in all the patients without any recurrence throughout the follow-up period. One of the patients returned with a spontaneous pregnancy three months post-resection of osseous material. The pregnancy was carried to term. However, she had an emergency caesarean section for suspected foetal distress in labour.

Table 3 Hysteroscopy findings and treatment outcomes

Findings/Outcomes	Frequency	Percentage
Procedure done		
Hysteroscopy alone	2	40.0
Hysteroscopy + laparoscopy	3	60.0
Type of bone tissue retrieved		
Long bone alone	2	40.0
Mixed Long and flat bone	2	40.0
Flat bone alone	1	20.0

Consistency of tissue		
Hard, easy to grasp	5	100.0
Sheets easily dislodged, but not fragmentable	4	40.0
Sheets, easily fragmented, floats within medium	1	20.0
Histology		
Bone tissue core	5	100.0
Surrounding chronic inflammatory cells	5	100.0
Dystrophic calcification peripherally	4	80.0
The outcome of vaginal discharge		
Immediate cessation of discharge	5	100.0
Recurrence	0	0
Spontaneous pregnancy post-resection of osseous material		
Yes	1	20.0
No	4	40.0
Interval to conception	<3 months	

Discussion

The incidence of 12.4/1000 (1.24%) obtained in our centre is much lower than the 26/1002 (2.6%), earlier reported by Okohue in Southern Nigeria, in hysteroscopy procedures done for similar indications (11). The reported occurrence rates from our settings in Nigeria are however much higher than the 0.15% incidence earlier reported by Makris et al from a developed Western European country (7). This shows a higher trend in the diagnosis of EOM in our settings. The rising proportion of patients requiring hysteroscopic evaluation of infertility and IVF workup in our setting and many sub-Saharan countries may lead to an increase in the incidence of EOM, a rare long-term complication of induced abortion (10). The relatively higher prevalence of unsafe abortion in Sub-Saharan Africa (10), may be responsible for the higher rates of this complication and may raise a higher index of suspicion of findings of EOM as hysteroscopy rates are expected to increase.

All of the five cases followed a pregnancy termination (most of which were induced); as high as 80% of cases of EOM have been previously reported to follow a pregnancy loss (12, 13). There is also agreement in the interval between pregnancy termination and hysteroscopic detection of osseous matter between our study (1-23 years) and earlier reports from India and Spain (8, 12), similar intervals were also reported from Southern and Eastern Nigeria (4, 11). An interval of up to 37 years had however been found in a Japanese woman (14).

Bone tissue was confirmed histologically in all cases. Continued proliferation of retained foetal bone tissue following uterine curettage for pregnancy termination, has been postulated as a reason for endometrial ossification (6, 15). Chronic non-specific inflammation with calcification apart from continuous proliferation is another possible explanation for the ossification of retained embryonic tissue after endometrial curettage (15). The finding of long bones and some identifiable flat bones largely support foetal origin. Endometrial ossification in a patient without a history of pregnancy, abortion, or endometrial instrumentation has however been reported (6). Iatrogenic endometrial ossification has also been reported in patients who underwent hysterosalpingography (16).

The unanimity in reports of fertility as the reason for presentation, despite reporting other presentations, like recurrent vaginal discharge, dysmenorrhea and abnormal uterine bleeding (2, 3, 5, 14, 15, 17); suggests an indolent and non-specific nature for these other presentations, which may be the reason for detection during infertility evaluation. Therefore, EOM should be considered as a differential diagnosis in patients presenting with these symptoms. The complete cessation of vaginal discharge after retrieval largely confirms EOM as its cause and hence complete hysteroscopic resection of the osseous materials.

It appears as though the inflammation within the endometrial cavity is responsible for infertility in the patients as most case reports have histologic evidence of inflammation within the endometrium (2, 3, 5, 6). Prevention of implantation and obliteration of the endometrial cavity are other mechanisms of contraception due to EOM (6). The occurrence of spontaneous pregnancy after resection of osseous materials in one of the patients in this case series suggests an association between EOM and infertility. Successful pregnancy after the removal of the osseous tissues supports the contraceptive effects of this condition (3, 5, 6).

D&C has been tried before the advent of hysteroscopy, repeated D&C is required for complete retrieval of osseous material and this may lead to perforation and uterine synechia. Incomplete removal is also common (4, 12, 13). Indeed, most of the patients in our series had D&C after the initial dilatation and evacuation had failed to remove all the osseous material within

the endometrium. The case of long bone impaction in a caudal direction into the myometrium is one that D&C is however unlikely to resolve. Hysteroscopy is especially useful for impacted bone, long bone retrieval and resection when the osseous material is numerous, as encountered in this case series. Check hysteroscopy to ensure complete retrieval is also possible while preventing endometrial damage and its sequela.

During D&C, the tendency is for the surgeon to further deepen the impaction because of the cervix-wards direction of curettage. Hysterectomy and D&C were the common methods of treatment of EOM before hysteroscopy became popular (18). The reproductive wishes of the patients will however not agree with a prescription of hysterectomy. Today, D&C is practised only in settings where hysteroscopy is unavailable (3, 4, 5, 6, 7). Laparotomy would be too invasive and portends the risk of peritoneal adhesions which may also adversely affect fertility. Cervico-utero lithotripsy was used for a patient with recurrent and adherent EOM, but this procedure depended on hysteroscopy for the complete retrieval of fragmented materials (19).

Endometrial osseous metaplasia can therefore be best treated by hysteroscopy. It is preceded in virtually all cases by a pregnancy termination; with a mid-trimester dilatation and evacuation as the commonest risk factor. The indolent nature of the vaginal discharge makes it a condition that is predominantly diagnosed during infertility evaluation.

Conclusion

Endometrial osseous metaplasia is a rare cause of persistent vaginal discharge and infertility. Most of the cases follow a pregnancy termination. Hysteroscopy is the mainstay of diagnosis and complete resection of the osseous materials. Spontaneous pregnancy is possible following complete resection, in patients without other fertility issues.

List of Abbreviations

3-D: 3 Dimensional
D&C: Dilatation and Curettage
D&E: Dilatation and Evacuation
EOM: Endometrial Osseus Metaplasia
IVF: In-Vitro-Fertilization
IUFD: Intrauterine foetal death
MVA: Manual Vacuum Aspiration
USS: Ultrasound scanning

Declarations

Ethical approval and consent to participate

Ethical clearance was obtained from the Babcock University Health Research Ethics Committee (BUHREC718/21), for the use of patient data. Written and signed informed consent was obtained from all of the patients, permitting the photographic and video recording of their images during hysteroscopy, excluding their faces. The procedure and data collection were conducted according to the Helsinki principle and all participants' data was stored in a password-protected computer accessible only to the principal investigator.

Consent for publication

All authors gave consent for publication of the work under the Creative Commons Attribution-Non-Commercial 4.0 license.

Availability of data and materials

The images of hysteroscopy are available in the computerised archives of hysteroscopy in the fertility and endoscopy unit of the Department of Obstetrics and Gynaecology, soft copies of the histology reports are available in the Department of Anatomic Pathology while all other patient information is in the patient files domiciled in the records department and the Babcock University Teaching Hospital, Health Information management system.

Competing interests

All of the authors declare that they have no conflict of interest regarding the publication of this manuscript.

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Authors' contributions

Conceptualization: IJO, AO,
Surgical procedure and case identification: IJO, ST, GOE, AR
Literature review: AO, ST, AR, ETC
Data Acquisition: IJO, GOE, AR, ETC
Writing of the initial draft: IJO, ST, AO
Reading and correction of the manuscript: All authors
The final draft of the manuscript: IJO, AO, GOE

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