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Original Research Article

Assessing the Efficacy and Role of MRI as an Imaging Modality in non-pregnant Females with Abnormal Uterine Bleeding

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Abstract

Background: The differential diagnosis and etiology of abnormal uterine bleeding are complex and varied. Histopathologic examinations are considered controversial to TAV and TAS making a non-invasive and advanced technology, MRI, a reliable tool and imaging modality for accurate diagnosis of abnormal uterine bleeding. **Objectives*:*** The present study was conducted to assess the role and efficacy of MRI in abnormal uterine bleeding (AUB) patients. **Methods*:*** In the present prospective clinical study, 102 subjects within the age of 21-85 years with abnormal uterine bleeding and who had prior surgery were assessed after recording detailed history and systemic examination. Following this, all subjects underwent MRI. The treatment was planned based on MRI diagnosis, medical conditions, desire to have further pregnancy, parity, and age. **Result*:*** Majority of subjects were within the age range of 31-50 years, parity was 2. The duration complaint in study subjects were acute <6 months in 22.54% (n=23) subjects and was chronic >6 months in 77.45% (n=79) subjects. Bleeding pattern was PMB, IMB, HPMB, and HMB in 11.76% (n=12), 20.58% (n=21), 32.35% (n=33), and 35.29% (n=36) study subjects. Pressure symptoms, dysmenorrhea, dyspareunia, Discharge per Vaginum, Heaviness in lower Abdomen, and Pain in lower Abdomen in 9.80% (n=10), 15.68% (n=16), 10.78% (n=11), 14.70% (n=15), 12.74% (n=13), and 19.60% (n=20) study subjects respectively. No compliant was reported by 4.90% (n=5) study subjects. **Conclusion*:*** The present study concludes that in subjects where clinical diagnosis is not confirmatory, sonography is decisive, even in subjects with no symptoms and normal findings. MRI is an accurate and promising imaging modality.

Keywords: Abnormal uterine bleeding (AUB), abnormal menstrual bleeding (AMB), parity, adenomyosis, magnetic resonance imaging (MRI)

Introduction

AUB (Abnormal Uterine Bleeding) is any bleeding outside normal frequency, regularity, duration, and volume. Abnormal bleeding in menstruation is depicted using terms such as oligomenorrhea, Polymenorrhea, Metorrhagia, and menorrhagia. The etiology and differential diagnosis of abnormal uterine bleeding are complex, heterogeneous, and varied. The etiologic factors responsible for abnormal uterine bleeding are uterine synechia, coagulation defects, OC pills, PCOS, IUCD, polyps, uterine and /or cervical infection, fibroids, Adenomyosis, ectopic pregnancy, miscarriage, and pregnancy. In vaginal cancers, cervical malignancies, uterine tumors, adenocarcinoma, and endometrial hyperplasia (precancerous), abnormal uterine bleeding is one of the most common presentations. Hence, identifying the particular etiologic factor leading to AUB is vital.[1,2,3]

Evaluation and diagnosis of AUB can be done by detailed and watchful history recording with clinical examination, endometrial sampling, MRI, hysteroscopy, sonohysterography, ultrasonography, hormonal profile, and blood investigations, to reach a definitive diagnosis. Management and investigations of AUB in nongravid female subjects in the reproductive age group is limited owing to lack of standardized methods, and inconsistently applied and confusing nomenclature to categorizing and investigating AUB and associated etiologies.[4,5]

FIGO classification system in 2011 has mentioned 9 main categories based on PALM-COEIN (pronounced “pahm-koin”) acronym describing: polyp, Adenomyosis, leiomyomas, malignancy and hyperplasia, coagulopathy, ovulatory dysfunction, endometrial, iatrogenic and not yet classified. Generally, PALM group components are measured visually using histopathology and imaging methods and are discrete. The components belonging to COEIN group relate to entities that are not identified histopathologically or by imaging.[6]

The First performed investigation in AUB cases is trans-vaginal ultrasound which is not 100% sensitive even in ideal cases owing to detection difficulty due to small lesions and polyps.[7,8] However, office hysteroscopy is available it can be advantageous as they can be removed in a single appointment. MRI can have a beneficial role in subjects where hysteroscopy is not feasible like in virginal women and adolescent females.[6]

MRI should be considered in females with fibroids and TUVS. MRI precision can eliminate the need for hysterectomy by allowing fibroids excision using hysteroscopy. MRI should be considered in suspicious cases of adenomyosis where ultrasound is not diagnostic. Appropriate results of imaging greatly depict the surgical route, surgery planning, and postoperative evaluation.[7] In females of reproductive age, with AUB, malignancy and atypical hyperplasia are potential causes.[8,9] Benign polyps, hyperplasia, and endometrial cancer may be overlapped on MRI with a potential role in biopsy staging.[10]

MRI has advantages of being non-invasive, multiplanar imaging, and tissue differentiating capabilities with the ability to alter contrast. MRI is also very sensitive to blood flow Speed and flow direction can also be determined with MRI along with biochemical blood state. MRI is also an adjunct and alternative to various other modalities. The present study was conducted to assess the role and efficacy of MRI in abnormal uterine bleeding (AUB) patients.

Materials and Methods

The present prospective analytical study was conducted to assess the role and efficacy of MRI in abnormal uterine bleeding (AUB) patients. The present study was conducted after obtaining clearance

from the concerned Ethical committee. The study population was comprised of the subjects visiting the Department of Obstetrics and Gynaecology of the institute with abnormal uterine bleeding. The study included a total of 102 subjects from both genders within the age range of 30-78 years and underwent surgery. The exclusion criteria were subjects having AUB with adnexal pathology.

After final inclusion, the included subjects were examined in detail concerning gynaecological (per speculum, per vaginal), systemic, physical, and general examination along with detailed history recording. This was followed by general and specific investigations in all subjects. All included subjects irrespective of ultrasound findings and baseline investigations underwent MRI of the pelvis region.

After MRI, dilatation and curettage was done. Following the screening, 20 subjects were excluded owing to normal MRI findings. Verbal and written consent was taken from all included study subjects. Treatment was planned based on MRI, medical conditions, desire to have further pregnancy, parity, and age.

1.5 Tesla MRI was in three planes in starting to localize and plan the sequences with less than 25-sec localizers. T1and T2 weighted low-resolution scans were used for the scans.

All the study subjects were followed for 4 weeks duration. 1st follow-up was done at week 1 and 2nd at week 4 for planning the proper treatment and assessing Histopathological complications. Following primary data collection, the collected data were subjected to the statistical evaluation using SPSS software version 21 (Chicago, IL, USA) and one-way ANOVA for results formulation. The data were expressed in percentage and number, and mean and standard deviation. The level of significance was kept at $p<0.05$.

Results

The present prospective analytical study was conducted to assess the role and efficacy of MRI in abnormal uterine bleeding (AUB) patients. The present prospective analytical study was conducted to assess the role and efficacy of MRI in abnormal uterine bleeding (AUB) patients. The demographic characteristics of the study subjects are depicted in Table 1. There were16,66% (n=17) subjects in the age group of 31-40 years, 61.76% (n=63) subjects in 41-50 years, 10.78% (n=11) in 51-60 years and 61-72 years age group. Concerning parity, there were 26.47% (n=27) females with 0 parity, 11.76% (n=12) with parity1, 47.05% (n=48) with parity 2, 10.78% (n=11) subjects with parity 3, and 3,92% (n=4) with grand multiparity.

The duration complaint in study subjects were acute <6 months in 22.54% (n=23) subjects and was chronic >6 months in 77.45% (n=79) subjects. Thyroid status was hyperthyroidism in 5.88% (n=6) subjects, hypothyroidism in 26.47% (n=27) subjects, Subclinical Hypothyroid in 34.31% (n=35) subjects, and euthyroid in 33.33% (n=34) subjects. Bleeding pattern was PMB, IMB, HPMB, and HMB in 11.76% (n=12), 20.58% (n=21), 32.35% (n=33), and 35.29% (n=36) study subjects as shown in Table 2.

No anaemia was seen in 37.25% (n=38) subjects, mild anaemia in 33.33% (n=34) subjects, moderate anaemia in 20.58% (n=21) subjects, and severe anaemia in 8.82% (n=9) study subjects. Other reported complaint were pressure symptoms, dysmenorrhea, dyspareunia, Discharge per Vaginum, Heaviness in lower Abdomen, and Pain in lower Abdomen in 9.80% (n=10), 15.68% (n=16), 10.78% (n=11), 14.70% (n=15), 12.74% (n=13), and 19.60% (n=20) study subjects respectively. No compliant was reported by 4.90% (n=5) study subjects (Table 3). Intramural Fibroidextending Upto Endometrium, Septate Uterus and Ca- Endometrium are

shown in atlas of few MRI images at the end of this literature.

Table 1: Demographic characteristics of the study subjects

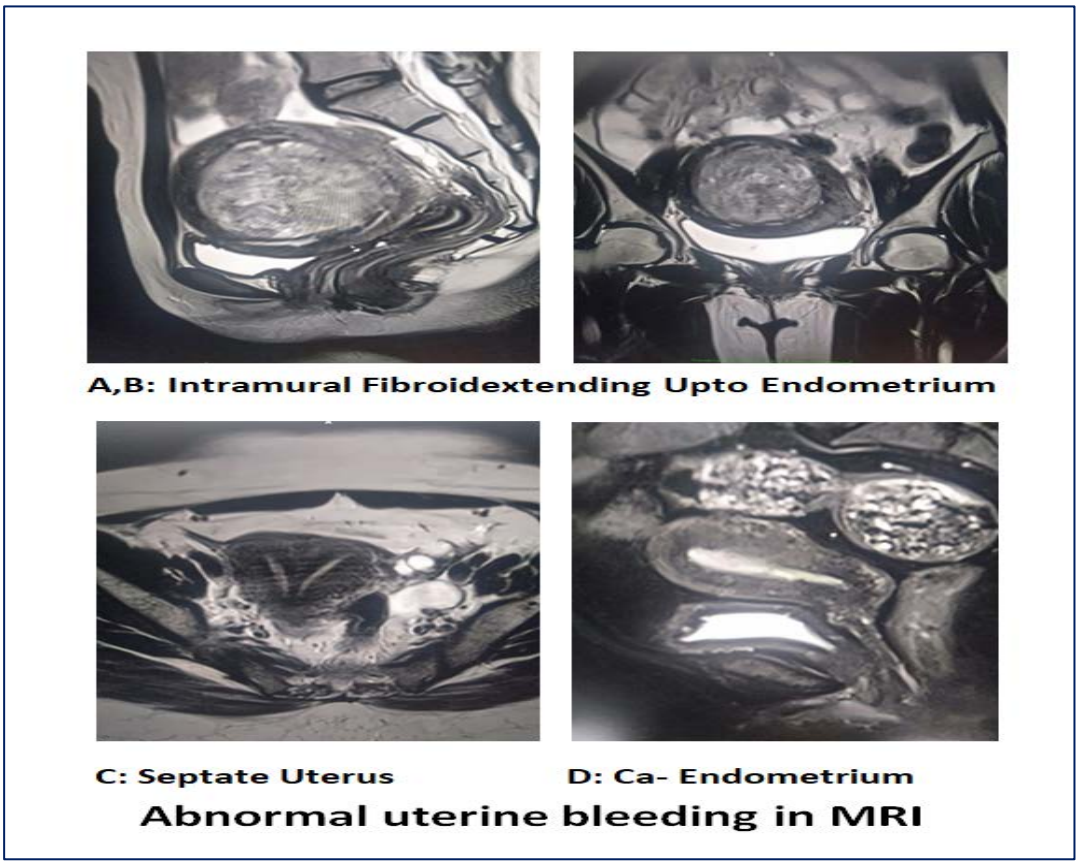
Characteristics	Percentage (%)	Number (n)
Age groups		
31-40	16.66	17
41-50	61.76	63
51-60	10.78	11
61-72	10.78	11
Parity		
0	26.47	27
1	11.76	12
2	47.05	48
3	10.78	11
Grand multipara	3.92	4

Table 2: Complaints of the study subjects with AUB

Parameter	Percentage (%)	Number (n)
Complaint duration		
<6 months (Acute)	22.54	23
>6 months (Chronic)	77.45	79
Thyroid Status		
Hyperthyroidism	5.88	6
Hypothyroidism	26.47	27
Subclinical Hypothyroid	34.31	35
Euthyroid	33.33	34
Pattern of Bleeding		
PMB	11.76	12
IMB	20.58	21
HPMB	32.35	33
HMB	35.29	36

Table 3: Associated complaints in the study subjects with AUB

Parameter	Percentage (%)	Number (n)
Anemia		
No Anaemia (≥ 11 gm/dL)	37.25	38
Mild Anaemia (9.5 - 11 gm/dL)	33.33	34
Moderate Anaemia (8 - 9.5 gm/dL)	20.58	21
Severe Anaemia (< 8 gm/dL)	8.82	9
Others		
Pressure Symptoms	9.80	10
Dysmenorrhea	15.68	16
Dyspareunia	10.78	11
Discharge per Vaginum	14.70	15
Heaviness in lower Abdomen	12.74	13
Pain in lower Abdomen	19.60	20
No Complaints	4.90	5



Discussion

The present prospective analytical study was conducted to assess the role and efficacy of MRI in abnormal uterine bleeding (AUB) patients. The present prospective analytical study was conducted to assess the role and efficacy of MRI in abnormal uterine bleeding (AUB) patients. were16,66% (n=17) subjects in the age group of 31-40 years, 61.76% (n=63) subjects in 41-50 years, 10.78% (n=11) in 51-60 years and 61-72 years age group. Concerning parity, there were 26.47% (n=27) females with 0 parity, 11.76% (n=12) with parity1, 47.05% (n=48) with parity 2, 10.78% (n=11) subjects with parity 3, and 3,92% (n=4) with grand multiparity. These demographics were comparable to what is studied by Breitkopf DM et al[11] in 2004 and Nair R et al[12] in 2015 where authors assessed the subjects with comparable demographics.

The duration complaint in study subjects were acute <6 months in 22.54% (n=23) subjects and was chronic >6 months in 77.45% (n=79) subjects. Thyroid status was hyperthyroidism in 5.88% (n=6) subjects, hypothyroidism in 26.47% (n=27) subjects, Subclinical Hypothyroid in 34.31% (n=35) subjects, and euthyroid in 33.33% (n=34) subjects. Bleeding pattern was PMB, IMB, HPMB, and HMB in 11.76% (n=12), 20.58% (n=21), 32.35% (n=33), and 35.29% (n=36) study subjects. These results were consistent with the results of Munro MG et al[13] in 2011 and Khan R et al[14] in 2016 where a similar clinical profile as in the present study was reported by the authors.

No anaemia was seen in 37.25% (n=38) subjects, mild anaemia in 33.33% (n=34) subjects, moderate anaemia in 20.58% (n=21) subjects, and severe anaemia in 8.82% (n=9) study subjects. Other reported complaints were pressure symptoms, dysmenorrhea, dyspareunia, Discharge per Vaginum, Heaviness in lower Abdomen, and Pain in lower Abdomen in 9.80%

(n=10), 15.68% (n=16), 10.78% (n=11), 14.70% (n=15), 12.74% (n=13), and 19.60% (n=20) study subjects respectively. No complaint was reported by 4.90% (n=5) of study subjects. These results were in agreement with the results of Grimbizis GF et al[15] in 2010 and Suresh M et al[16] in 2017 where comparable associated complaints were reported by the authors as in the present study.

Conclusion

Within its limitations, the present study concludes that abnormal uterine is a commonly presented finding in females of the peri-menopausal age group of 40-51 years with medical disorders, Myoma to malignancies being the associated etiological factors. Although MRI is a costly imaging modality, for the subjects with no financial constraints, even with no symptoms and normal findings, MRI should be the investigation and imaging modality of choice. It also plays a vital role in staging and diagnosing cancers, which is a common cause of abnormal uterine bleeding.

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