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Research Article

Histopathological Study of Adenomyosis and Leiomyomas in Hysterectomy Specimens in Patients of Abnormal Uterine Bleeding At Tertiary Care Centre

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ABSTRACT
BACKGROUND: Adenomyosis is a benign disorder of uterus in which glands and stroma of endometrium are pathologically present in the myometrium. Women having adenomyosis may present with AUB, dysmenorrhea, dyspareunia or infertility. Fibroid or leiomyoma is the most common tumour in women. Approximately more than 70% of women will have experienced at least one fibroid by the age of 50 years. Fibroids can cause miscarriage, preterm labour, obstruction of labour and subfertility.1Additionally, they may exert pressure on urinary system and cause discomfort.
AIM AND OBJECTIVES: 1. To study histopathological changes of adenomyosis and leiomyomas in hysterectomy specimens in patients of abnormal uterine bleeding at tertiary care centre. 2. To determine percentage of adenomyosis and leiomyomas in hysterectomy specimens.3. To study coexistence of adenomyosis and leiomyomas in hysterectomy specimens.
METHODS: Study Design: Descriptive Cross-sectional study. **Study Population:** Female patients admitted in Dr. PDMMC, hospital and research center, Amravati and undergone hysterectomy for abnormal uterine bleeding during study period such cases were included in the study. **Study Duration:** 18 months (2023 to 2025). **Sample size:** 349
RESULTS: The highest proportion (n=256, 73.35%) was observed in the 41–60 years age group, followed by 74 participants (21.20%) in the 21–40 years. pain in abdomen(P) was a presenting complaint in 299 (85.7%), menorrhagia was a presenting complaint in 298 (85.4%) and Dysmenorrhea(D)was a presenting complaint in 224 (64.2%) participants. Out of 349 participants, 232 (66.5%) had leiomyoma, out of which intramural leiomyoma was the most common type (n = 196, 84.5%) followed by intramural subserosal combination (n = 15, 4.3%). Out of 349 participants, 97 (28%) had adenomyosis on, Age group of 41-60 years had the largest number of adenomyosis cases. Out of these 349, majority specimens showed proliferative phase (n = 175, 50.14%) followed by secretary phase (n = 138, 39.4%). Out of 349 participants, 154 (44.1%) had hyperplasia, 19 (5.4%) had hyperplasia with or without atypia and 24 (6.9%) had endometrial polyp. Out of 349 participants, 64 (18.3%) had coexistence of leiomyoma and adenomyosis of myometrium.
CONCLUSIONS: The highest proportion was observed in the 41–60 years age group, Most common complaint was pain in abdomen, 66.5% had leiomyoma, out of which intramural leiomyoma was the most common type, 28% had adenomyosis, majority specimens showed proliferative phase,18.3% had coexistence of leiomyoma and adenomyosis of myometrium.

Keywords: Abnormal Uterine Bleeding, Leiomyoma, Adenomyosis, Endometrial Findings.

INTRODUCTION

Abnormal uterine bleeding (AUB) is the most common clinical condition that affect women in reproductive age. [1] It is defined as, —bleeding from the uterine corpus that is abnormal in regularity, volume, frequency or duration and occurs in the absence of pregnancy —. [2] Along with other subgroup, heavy menstrual bleeding (HMB), AUB affects 14-25% of reproductive age-group women and become one of the most common causes to seek help from gynecologists. [1, 3, 4]

Annually, around 8 lakhs women seek help for AUB from the health facilities.[1] It also possesses a significant impact on physical, emotional, social and material quality of life. [1] Additionally, it directly affects woman and her family and indirectly affects society's economy and health service. [1] For instance, in US, a financial loss of more than 2000 USD per patient annually due to work absenteeism and home management costs has been reported.5 Furthermore, AUB is the fourth

commonest cause for gynaecological referrals in UK. [5]

An interesting fact was found in a national audit done in England and Wales stating that only 33% of all women having HMB or other menstrual symptoms were satisfied after the treatment (which also included surgical interventions). [1] Fibroid or leiomyoma is the most common tumour in women. [6]

Approximately more than 70% of women will have experienced at least one fibroid by the age of 50 years. [6] Fibroids can cause miscarriage, preterm labour, obstruction of labour and subfertility.1Additionally, they may exert pressure on urinary system and cause discomfort. [1] Rarely, they can cause renal tract and pelvic vasculature compression and may lead to venous thromboembolism and impaired renal function. [1] However, most of the women with leiomyomas do not show any symptoms. [7]

The most common symptoms of fibroid are AUB and iron-deficiency anaemia. [1] If AUB is undiagnosed or unresponsive to medical treatment, most of the females land up in anaemia and surgical interventions such as hysterectomy become necessity. Fibroid is one of the leading causes of hysterectomy as women with uterine fibroids has a disrupted day-to day life.[1] As per Fraser et al., menstruation is said to be normal if: frequency of menses ranges 24-38 days; variation in regularity ranges 2-20 days; duration of flow ranges between 4.5-8 days and 5-80 ml blood loss. [8] Anything other than the above values is considered as abnormal bleeding.

Chronic AUB is defined as abnormal uterine bleeding for at least 6 consecutive months. [9] In addition to this, the Royal College of Obstetricians and Gynecologists (RCOG) and American College of Obstetricians and Gynecologists (ACOG) define HMB as excessive menstrual bleeding which disrupts women's physical, social, emotional and marital quality of life.[1] Causes of AUB Once uterine bleeding is identified as abnormal, the acronym PALM-COEIN given by (International Federation of Gynecology and Obstetrics (FIGO) is being utilized to segregate causes of AUB.[9] P – Polyp A – Adenomyosis L – Leiomyoma M – Malignancy C – Coagulopathy O – Ovulatory Disorders E – Endometrial I – Iatrogenic N – Not otherwise Classified

Adenomyosis is a benign disorder of uterus in which glands and stroma of endometrium are pathologically present in the myometrium. [10] Women having adenomyosis may present with AUB, dysmenorrhea, dyspareunia or infertility. [10] However, one third of these women may not show any symptom. 10 the relationship between AUB and adenomyosis is not clear. [11] Moreover, adenomyosis can coexist with leiomyoma and endometriosis, which often complicate the clinical diagnosis. [12, 13] Earlier, adenomyosis was considered as a surgical diagnosis after removal of uterus.[10]

However, with the advancement in radio-diagnostic modalities, precise diagnosis can be made in situ. [10, 14, 15] Despite these improvements, the diagnosis still remains unclear due to lack of agreement in histopathological grading and imaging criteria. Hence, accurate population prevalence of adenomyosis is underestimated. [10] The percentage of uterine specimens having adenomyotic features varies from 5% to 70%. [10]

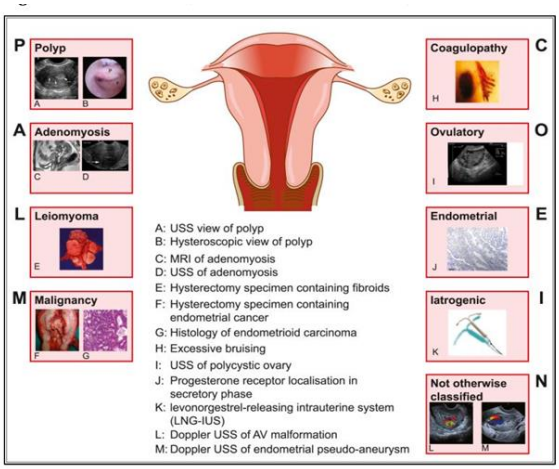


Figure No: 1 Causes Of AUB(PALM-COEIN Classification) [1]

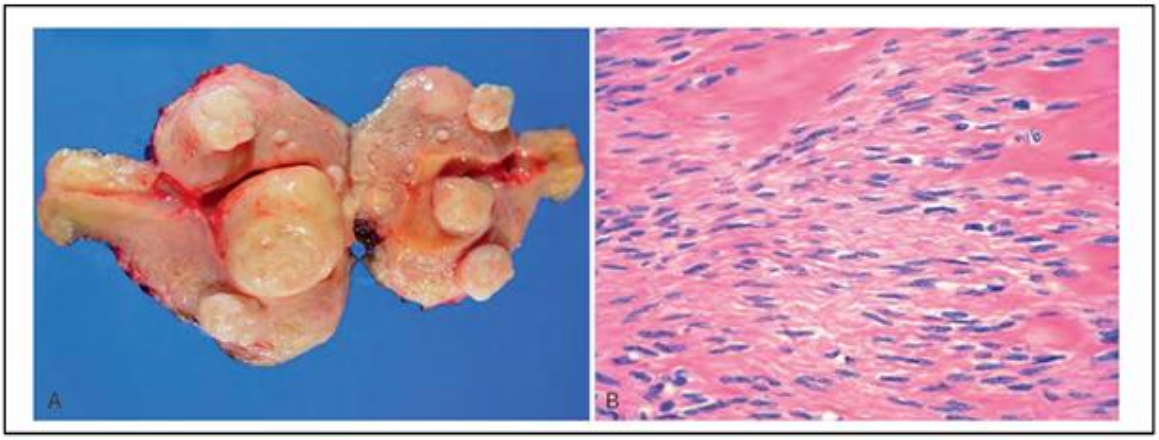
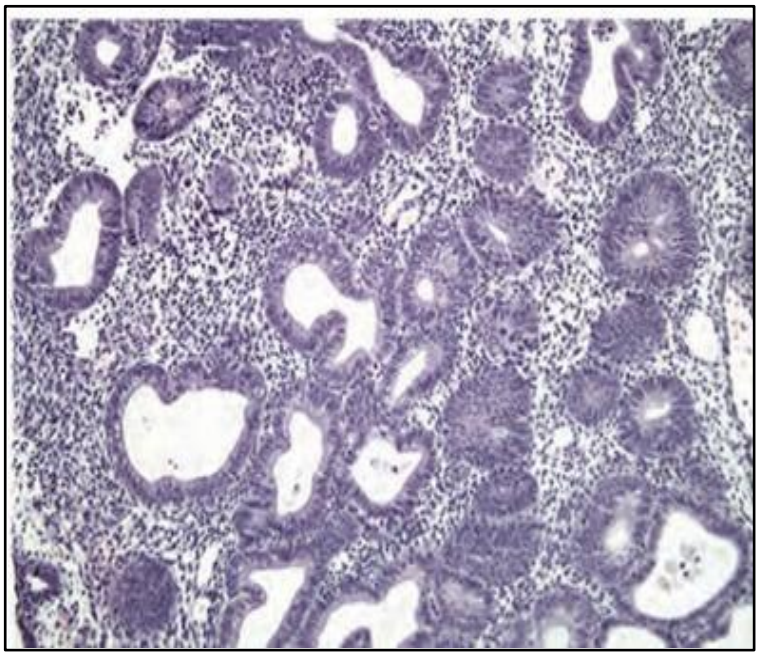


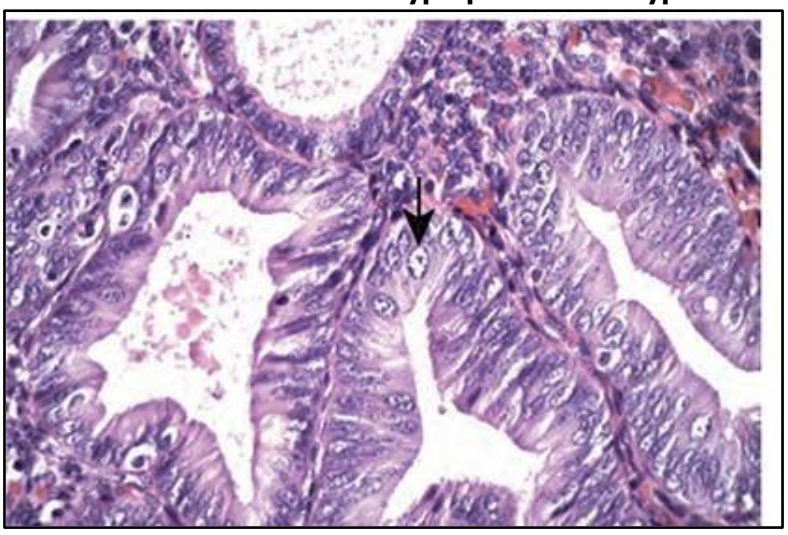
Figure no: 2 Leiomyomas of the uterine myometrium (A) The uterus is opened to reveal multiple tumours in submucosal (bulging into the endometrial cavity), intramural, and subserosa locations that display a firm white appearance on sectioning. (B) Leiomyoma showing well differentiated, regular, spindle-shaped smooth muscle cells associated with hyalinization.

Figure no: 3 a) Gross appearance of adenomyosis b) microscopic appearance of adenomyosis

a. Simple endometrial hyperplasia



b. Endometrial hyperplasia with atypia



2. Figure no:4 Histopathological slide of endometrial hyperplasia

AIM AND OBJECTIVES

Aim: To study histopathological changes of adenomyosis and leiomyomas in hysterectomy specimens in patients of abnormal uterine bleeding at tertiary care center.

Objective: 1. to determine percentage of adenomyosis and leiomyomas in hysterectomy specimens. 2. To study coexistence of adenomyosis and leiomyomas in hysterectomy specimens. 3. To study the histomorphological changes of endometrium in association with adenomyosis and leiomyoma of hysterectomy specimens at tertiary care center.

MATERIAL AND METHODS

The present study was conducted in a tertiary care hospital from August 2023 to February 2025. Before commencing the study, approval from the Institutional Ethics Committee (IEC) was obtained.

Type of study: Descriptive Cross-sectional study. Place of study: Department of Pathology of a Dr. PDMMC, hospital and research center, Amravati. Period of study:18 months (2023 to 2025) Study participants: Female patients admitted in tertiary care hospital and undergone hysterectomy for abnormal uterine bleeding (AUB). Study tool: Pre-tested, pre-validated semi structured case record form.

- Inclusion criteria: 1. Female patients undergoing hysterectomy presenting with clinical symptoms and AUB.
- Exclusion criteria: 1. Hysterectomy performed for suspected malignancy of female genital tract. 2. Patients undergoing hysterectomy for obstetric indications. 3. Patients not giving consent.
- Sample size: Convenience sampling technique

Sample size calculation formula:

Sample size formula:

$$n = \frac{(DEFF)\,Np(1-p)}{[\frac{d^2}{Z^2_{1-\frac{\alpha}{2}}}][(N-1)+p(1-p)]}$$

In this formula, N = Population size (for finite population correction factor or FPC) = 1000000 p = Hypothesized % frequency of outcome factor in the population = 34.9%17 d = Confidence limits as % of 100(absolute +/- %) = 5% DEFF = Design effect (for cluster surveys) = 1 Z = 1.96 (at 95% Confidence Interval) n = 349

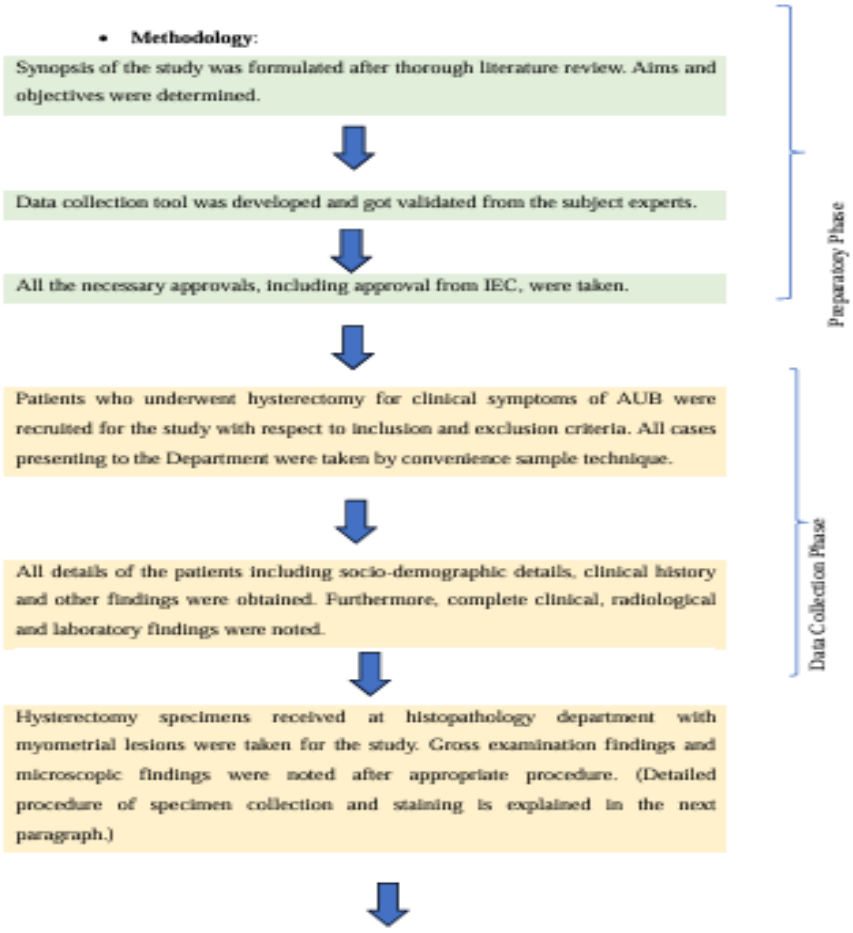
- Sampling method: Convenience sampling technique (every patient fulfilling inclusion criteria and exclusion criteria was recruited for the study till the desired sample size was achieved).

Staining method: The tissue sections were processed with hematoxylin and eosin stain procedure. First, all the tissue sections were deparafffinisedby xylene for 5- 10 minutes. Then the sections were subjected to water through reducing grades of alcohol from 100% to 50% and kept in hematoxylin for 15 to 20 minutes. After keeping them in hematoxylin,

tissue sections were rinsed under tap water and differentiated with 1% acid alcohol. For bluing, the sections were placed in the running tap water for about 10 minutesandcounterstainedwith eosin 1 to 2minutes. After final rinsing in water the sections were dehydrated, cleared and mounted for microscopic examination.

Microscopic examination: Microscopic sections were studied and following histological features were noted:

a) Endometrial parameters: endometrial phase, appearance of glands and stromal changes, any abnormal appearance, hyperplasia etc.
b) Myometrial parameters: presence or absence of adenomyosis, type or variant of leiomyoma.



Data Analysis
Study Flow diagram

OBSERVATION AND RESULT

The current study was carried out for a period of 18 months on 349 cases where hysterectomy specimens were collected and evaluated.

Table No: 1Age Distribution of the Participants

Age (years)	No. of participants	Percentage
21-40	74	21.20
41-60	256	73.35
61-80	18	5.16
>80	1	0.29
Total	**349**	**100.00**

In the present study, out of 349 participants, the highest proportion (n=256, 73.35%) was observed in the 41–60 years age group, followed by 74 participants (21.20%) in the 21–40 years. The mean±SD age was found to be 45.95±7.23 years with median age 45

years. The youngest participant was 25 years old, while the oldest was 83 years old. All participants were females.

Table No: 2 Age-Wise Distribution of Types of Leiomyoma on Gross Examination

Leiomyoma Types	Age Groups				Total
	21-40	41-60	61-80	>80	
Intramural	40	153	3	0	**196 (84.5%)**
Intramural and Subserosal	5	8	2	0	**15 (6.5%)**
Intramural and Submucosal	2	1	0	0	**3 (1.3%)**
Intramural Subserosal and Submucosal	0	2	0	0	**2 (0.9%)**
Subserosal	2	9	0	0	**11 (4.7%)**
Submucosal	2	2	0	0	**4 (1.7%)**
Leiomyosarcoma	0	1	0	0	**1 (0.4%)**
Total	**51**	**176**	**5**	**0**	**232 (100%)**

All age groups except, >80 years, had leiomyomas with intramural being the most common type (n = 196, 84.5%). It was observed that, intramural leiomyoma was the most common type of leiomyoma in all the age groups. Age group of 41-60 years had more numbers of leiomyomas than other age groups. Additionally, all types of tumors were more common in the age group 41-60 years.

Table No: 3 Gross Examination And Age Wise Distribution Of Adenomyosis In The Participants

Status	Adenomyosis	
	Frequency	Percentage
21-40	17	17.5
41-60	74	76.3
61-80	5	5.2
>80	1	1.0
Total	**97**	**100.00**

Age group of 41-60 years had the largest number of adenomyosis cases (n = 74, 76.3%) followed by age group 21-40 (n = 17, 17.5%).

Table No: 4 Findings Of Endometrial Examination In The Participants (N = 349)

Endometrium	No. of participants	Percentage
Proliferative Phase	175	50.14
Secretory Phase	138	39.54
Senile Atrophy or cystic changes	29	8.3
Autolytic Changes	3	0.8
Disordered Proliferation	2	0.5
Hormonal Imbalance	2	0.5
Total	**349**	**100.00**

Out of these 349, majority specimens showed proliferative phase (n = 175, 50.14%) followed by secretary phase (n = 138, 39.4%).

Table No: 5 Endometrial Examination And Its Findings

Status	Hyperplasia		Hyperplasia with or without atypia		Polyp	
	n	%	n	%	n	%
Present	154	44.1	19	5.4	24	6.9
Absent	195	55.9	330	94.6	325	93.1
Total	**349**	**100**	**349**	**100**	**349**	**100**

Out of 349 participants, 154 (44.1%) had hyperplasia, 19 (5.4%) had hyperplasia with

or without atypia and 24 (6.9%) had endometrial polyp.

Table No: 6 Distribution of coexistence of leiomyoma and adenomyosis in the participants

Status	Coexistence of Leiomyoma and Adenomyosis	
	Frequency	Percentage
Present	64	18.3
Absent	285	81.7
Total	**349**	**100.0**

Out of 349 participants, 64 (18.3%) had coexistence of leiomyoma and adenomyosis of myometrium.

DISCUSSION

Uterine leiomyomas, commonly found in women of reproductive age, are benign tumours originating from the smooth muscle of the uterus. They are highly prevalent, with histopathological studies of hysterectomy specimens indicating an occurrence rate of up to 77%, irrespective of the surgical indication. Despite their high prevalence, only around 25% of affected women experience significant clinical symptoms. These symptoms, which are influenced by the size and location of the fibroids, may include abnormal uterine bleeding, pelvic discomfort, and infertility. Adenomyoma, often considered a variant of leiomyoma, raises the question of whether it represents a true tumour or simply a distinct form of adenomyosis, a topic that remains understudied from a pathogenetic perspective.

In the present study, out of 349 participants, the highest proportion (n=256, 73.35%) was observed in the 41–60 years age group, followed by 74 participants (21.20%) in the 21–40 years. The mean±SD age was found to be 45.95±7.23 years with median age 45 years. The youngest participant was 25 years old, while the oldest was 83 years old. All age groups except, >80 years, had leiomyomas with intramural being the most common type (n = 196, 84.5%). It was observed that, intramural leiomyoma was the most common type of leiomyoma in all the age groups.

Age group of 41-60 years had more numbers of leiomyomas than other age groups. Additionally, all types of tumors were more common in the age group 41-60 years. Age group of 41-60 years had the largest number of adenomyosis cases (n = 74, 76.3%) followed by age group 21-40 (n = 17, 17.5%). This finding was consistent with Akhter et al [16] who reported that fibroid uterus was most frequently observed in women over 40 years (62%). Vannuccini et al [17] who noted that adenomyosis was most prevalent among women aged 41–50 years (70.8%). Rizvi et al [18] reported a peak incidence of these conditions in perimenopausal women.

In the present study, the proliferative phase was the predominant endometrial pattern observed in AUB patients with leiomyoma (55.94%) and adenomyosis (50.89%), comparable to findings reported by Dangal et al [19], Doraiswami et al [20], and Goyal et al [21] Secretory changes were the second most common pattern across all groups. In dual pathology cases, proliferative changes were similarly prevalent (56.25%), aligning with Sunanda et al [22] Endometrial hyperplasia cases showed nearly equal distribution between proliferative (51.29%) and secretory phases (48.05%), in contrast to previous studies by Muzaffar et al [23] and Khare et al [24] which showed a higher incidence of disordered endometrium. Atrophic, disordered, and autolytic changes were infrequent across all categories. Overall, the predominance of cyclical endometrial changes suggests preserved ovulatory function in a majority of AUB cases, even in the presence of structural uterine pathologies

In the present study, 65% leiomyomas were identified while 32.1% adenomyosis were observed similar to Pathology outlines, Sagar et al [25] These findings closely aligned with those of Dayal and Nagrath, who reported similar proportions of leiomyomas (64.5%) and adenomyosis (29.7%) in hysterectomy specimens.[26] Ngorili et al [27] in Maharashtra, where myometrial lesions were found in 78% of hysterectomy specimens.

Conclusion: The highest proportion was observed in the 41–60 years age group, Most common complaint was pain in abdomen, 66.5% had leiomyoma, out of which intramural leiomyoma was the most common type, 28% had adenomyosis, majority specimens showed proliferative phase,18.3% had coexistence of leiomyoma and adenomyosis of myometrium.

Limitations of the study:

Generalizability of the study: The present study was conducted in a single center of a particular geographical area. Hence the generalizability of results may not be adequate.

Exclusion of certain groups: Exclusion of patients undergoing hysterectomy for suspected malignancy or obstetric indications limits the scope of the study and may overlook variations in outcomes associated with these conditions with respect to adenomyosis and leiomyoma.

Recommendation: Public health initiatives should focus on early detection of uterine, cervical, and ovarian pathologies through regular gynaecological check-ups and Pap smears. Women at high risk for endometrial and ovarian malignancies should undergo routine screening and genetic counselling where indicated.

Bibliography

1. Whitaker L, Critchley HOD. Abnormal uterine bleeding. Best Pract Res Clin Obstet Gynaecol. 2016 July;34:54–65.
2. Committee on Practice Bulletins—Gynecology. Practice bulletin no. 128: diagnosis of abnormal uterine bleeding in reproductive-aged women. Obstet Gynecol. 2012 July;120(1):197–206.
3. Fraser IS, Langham S, Uhl-Hochgraeber K. Health-related quality of life and economic burden of abnormal uterine bleeding. Expert Rev Obstet Gynecol. 2009 Mar;4(2):179–89.
4. Shapley M, Jordan K, Croft PR. An epidemiological survey of symptoms of menstrual loss in the community. Br J Gen Pract J R Coll Gen Pract. 2004 May;54(502):359–63.
5. Frick KD, Clark MA, Steinwachs DM, Langenberg P, Stovall D, Munro MG, et al. Financial and Quality-of-Life Burden of Dysfunctional Uterine Bleeding Among Women Agreeing To Obtain Surgical Treatment. Womens Health Issues. 2009 Jan;19(1):70–8.
6. Day Baird D, Dunson DB, Hill MC, Cousins D, Schectman JM. High cumulative incidence of uterine leiomyoma in black and white women: Ultrasound evidence. Am J Obstet Gynecol. 2003 Jan;188(1):100–7.
7. Brahma PK, Martel KM, Christman GM. Future Directions in Myoma Research. Obstet Gynecol Clin North Am. 2006 Mar;33(1):199–224.
8. Fraser I, Critchley H, Broder M, Munro M. The FIGO Recommendations on Terminologies and Definitions for Normal and Abnormal Uterine Bleeding. Semin Reprod Med. 2011 Sept;29(05):383–90.
9. Munro MG, Balen AH, Cho S, Critchley HOD, Díaz I, Ferriani R, et al. The FIGO ovulatory disorders classification system. Int J Gynaecol Obstet Off Organ Int Fed Gynaecol Obstet. 2022 Oct;159(1):1–20.
10. Gopinath L, Vaidya R. Prevalence of adenomyosis and associated gynaecological pathologies in hysterectomy samples: a retrospective study. Int J Res Med Sci. 2021 Aug 25;9(9):2606.
11. Naftalin J, Hoo W, Pateman K, Mavrelos D, Foo X, Jurkovic D. Is adenomyosis associated with menorrhagia? Hum Reprod. 2014 Mar 1;29(3):473–9.
12. Leyendecker G, Bilgicyildirim A, Inacker M, Stalf T, Huppert P, Mall G, et al. Adenomyosis and endometriosis. Re-visiting their association and further insights into the mechanisms of auto-traumatisation. An MRI study. Arch Gynecol Obstet. 2015 Apr;291(4):917–32.
13. Hulka CA, Hall DA, McCarthy K, Simeone J. Sonographic Findings in Patients with Adenomyosis: Can Sonography Assist in Predicting Extent of Disease? Am J Roentgenol. 2002 Aug;179(2):379–83.
14. Van den Bosch T, Van Schoubroeck D. Ultrasound diagnosis of endometriosis and adenomyosis: State of the art. Best Pract Res Clin Obstet Gynaecol. 2018 Aug;51:16–24.
15. Agostinho L, Cruz R, Osório F, Alves J, Setúbal A, Guerra A. MRI for adenomyosis: a pictorial review. Insights Imaging. 2017 Dec;8(6):549–56.
16. Akhter M, Salam A, Anwar K, Alam M, Shoma AK, Salim M. Clinical Profile and Management Option of Fibroid Uterus Patient. Chattagram Maa-O-Shishu Hosp Med Coll J. 2015 Nov 16;14(2):48–51.
17. Vannuccini S, Luisi S, Tosti C, Sorbi F, Petraglia F. Role of medical therapy in the management of uterine adenomyosis. Fertil Steril. 2018

Mar;109(3):398– 405.

18. Rizvi G, Pandey H, Pant H, Chufal SS, Pant P. Histopathological correlation of adenomyosis and leiomyoma in hysterectomy specimens as the cause of abnormal uterine bleeding in women in different age groups in the Kumaon region: A retroprospective study. J -Life Health. 2013 Jan;4(1):27–30.
19. Dangal G, Thapa K, Pradhan S. Abnormal uterine bleeding and histopathology of endometrium. Nepal Med Coll J. 2013;15(1):27–30.
20. Doraiswami S, Johnson T, Rao S, Rajkumar A, Vijaykumar DK. Study of endometrial pathology in abnormal uterine bleeding. J Obstet Gynaecol India. 2011;61(4):426–430.
21. Goyal LD, Gupta R, Goel P, Tandon A. Histopathological spectrum of endometrium in abnormal uterine bleeding with and without adenomyosis. J Midlife Health. 2017;8(2):84–88.
22. Sunanda R, Vanita S, Vandana J. Histopathological study of endometrial patterns in abnormal uterine bleeding associated with leiomyoma and adenomyosis. Int J Reprod Contracept Obstet Gynecol. 2019;8(5):1940–1945.
23. Muzaffar M, Akhtar KA, Yasmin S, Mahmood-ur-Rahman, Iqbal W, Khan MA. Menstrual irregularities with excessive blood loss: a clinicopathological correlation. J Pak Med Assoc. 2005;55(11):486–489.
24. Khare A, Bansal R, Sharma S. Histopathological study of endometrium in abnormal uterine bleeding. J Midlife Health. 2014;5(2):55–58.
25. Sagar N, Tomar R, Maulana Azad Medical College, Delhi, India, Balhara K, Maulana Azad Medical College, Delhi, India, Mallya V, et al. Histopathological
26. Association of Adenomyosis with Various Gynaecological Pathologies. Ann Pathol Lab Med. 2020 May 28;7(5):A221-223.
27. Dayal S, Nagrath A. Pattern and frequency of endometrial and ovarian pathologies with adenomyosis uteri in patients who attended the tertiary care hospital among rural population of North India. MAMC J Med Sci. 2015;1(3):147.
28. Ngorili GS, Yadav BB, Takalkar AA. Epidemiological study of uterine fibroids: our experience from urban Maharashtra. Int J Reprod Contracept Obstet Gynecol. 2022 July 27;11(8):2101.