Role of Diagnostic Hysteroscopy in Abnormal uterine bleeding in perimenopausal females and its histopathological correlation

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Abstract
Background: Abnormal uterine bleeding is defined as any deviation from the normal menstrual cycle which includes any change in regularity, frequency of menses, duration or amount of bleeding during or in between periods. Objective of this study is to evaluate the diagnostic hysteroscopy in perimenopausal women with abnormal uterine bleeding.

Methods: This study was conducted in women presenting to the gynecological OPD with complain of abnormal uterine bleeding in perimenopausal age group. A total of 50 patients were subjected to diagnostic hysteroscopy.

Results: In this study the Mean age was 44.3 yr. Majority (48%) of patients were in age group of 40-44 yrs. 94% were multiparous. 50% presented with heavy menstrual bleeding. In 56% hysteroscopy was normal and remaining 44% showed abnormal endometrial finding, out of which endometrial hyperplasia seen in 20% cases, polyp in 16% and sub mucosal fibroid in 8% cases. Hysteroscopy has 100% sensitive and 100% specific for endometrial polyp and sub mucosal fibroid indicating that hysteroscopy is the best modality for diagnosing intrauterine pathologies. In the present study hysteroscopy had overall sensitivity, specificity, PPV, NPV 89.36%, 94.77%, 84% & 96.66%.

Conclusion: Hysteroscopy is important tool for diagnosing various intrauterine lesions. It should be employed hand in hand in evaluation on AUB.

Keywords: hysteroscopy, abnormal uterine bleeding, endometrial pathology.

Introduction
Abnormal uterine bleeding is defined as any deviation from the normal menstrual cycle which include any change in frequency, duration or amount of bleeding during menses or bleeding in between periods.¹,² AUB is responsible for 20-30% of patients who attend gynecology OPD amongst women in reproductive age group and 50% in perimenopausal women³.

The International Federation of Gynecology and Obstetrics working group on menstrual disorders has proposed a classification system (PALM-COEIN) for causes of the AUB in women.⁴ There are nine main categories, which are arranged according to the acronym PALM-COEIN. PALM-
refers to structural causes and COEIN refers to nonstructural causes; the acronym stands for Polyp; Adenomyosis; Leiomyoma; Malignancy and hyperplasia; Coagulopathy; Ovulatory Dysfunction; Endometrial; Iatrogenic; and not yet classified. More than one etiology can be present in the same patient. Among all, fibroid and polyp are one of the most common causes responsible for AUB in approximately 20-40% women suffering from AUB.

In perimenopausal women presenting with AUB, endometrial hyperplasia accounts for 11.8%, polyp 4.2% and adenocarcinoma 5.5% as the etiologies. Endometrial hyperplasia is a known precursor for endometrial carcinoma. Less than 2% of hyperplasia without atypia progress to endometrial carcinoma in 23% over a mean duration of 4 years. AUB needs to be investigated in detail with proper history, examination and investigations. Various tools available for diagnosis of AUB are Transvaginal Sonography (TVS), Saline Sonography, and Hysteroscopy all confirmed by histopathology report. TVS is an inexpensive, non-invasive and a convenient way to assess the uterine pathology not discernible on pelvic examination. Therefore, it is recommended as a first line diagnostic tool for assessing uterine pathology.

In perimenopausal women, TVS showing ET of less than 5 mm, the probability of the woman having endometrial cancer is 1.7% and it is 0.8% when the cut-off is taken as 4 mm. Transvaginal ultrasound detects intracavitary abnormalities like uterine tumors, polyps, and endometrial and myometrial abnormalities with a sensitivity of 60–92% and a specificity of 62–93%.

Due to low sensitivity of TVS for diagnosing endometrial polyps and other intrauterine pathology, examination with other techniques like saline infusion sonohysterography (SIS) or hysteroscopy should be considered. Another limitation of ultrasound is that it cannot always reliably distinguish between benign proliferation, hyperplasia, polyps, and cancer, and in 5–10% of women with postmenopausal bleeding, the endometrium cannot be identified on TVS, these women need further evaluation with more sensitive techniques.

Hysteroscopy enables direct visualization of uterine cavity and giving an opportunity to treat the lesion in the same sitting if applicable. Hysteroscopy is more sensitive than TVS or Dilation & Curettage which is performed blindly. Hysteroscopy is recommended to further evaluate the endometrium in perimenopausal women with abnormal uterine bleeding even when the endometrial echo texture is normal on transvaginal sonography. Hysteroscopy guided biopsy is considered the gold standard for assessing the endometrium.

With advancement in hysteroscopy techniques and better equipment, hysteroscopy has now become very easy to perform on OPD basis office hysteroscopy with minimal anesthesia and complication.

In this study after detail clinical and physical examination TVS and hysteroscopy was done in all cases. The results of hysteroscopy were compared to finding with histopathology, and the sensitivity, specificity and efficacy of hysteroscopy in diagnosing the etiologies was calculated.

**Aim & Objective**

1. To estimate the diagnostic accuracy of Hysteroscopy in evaluation of uterine cavity lesion in perimenopausal women with abnormal uterine bleeding.
2. To estimate the sensitivity and specificity of hysteroscopy in diagnosis of intracavitary lesion in perimenopausal women with abnormal uterine bleeding.

**Methods**

This is a prospective study conducted in department of Obstetrics & Gynecology in Mahatma Gandhi Hospital, Jaipur from 2017 to 2018 over a period of one year. Women in perimenopausal age group presenting to the
gynecological OPD with complain of abnormal uterine bleeding were the subject of interest. The inclusion and exclusion criteria were applied and the women who were eligible to participate and who gave written consent were enrolled in the study.

A total of 50 women who met the inclusion criteria were selected and after explaining the procedure, the consent was signed.

**Inclusion Criteria**

1) Perimenopausal age group (40-55)
2) Having abnormal uterine bleeding
3) Uterus less than 12 weeks size.

**Exclusion Criteria**

1) Acute pelvic infection
2) Uterus more than 12 week size
3) Pregnant women
4) Vaginal or cervical cause of bleeding
5) Bleeding disorder
6) Any drug intake causing AUB

A detailed history including menstrual history regarding the cycle length, duration and amount of flow during menses was taken and thorough clinical examination was done. A relevant medical history of any systemic illness and drug intake which can cause AUB was also taken. After the general physical examination local and per speculum examination was done to note for any abnormal vaginal discharge, erosion, cervical hypertrophy or cervical polyp. A per vaginal examination was done to know about any uterine cervical and adnexal abnormality.

Laboratory investigations including CBC, coagulation profile, random blood sugar, liver and kidney function test were done. All the patients were subjected to transvaginal sonography and parameters such as endometrial thickness, uterine pathology, adnexal and any other pelvic pathology was noted; after that diagnostic hysteroscopy and guided biopsy was performed. The tissue was sent for histopathological examination.

**Hysteroscopy**

- **Proliferative phase** endometrium is smooth and pink-white in color, gland openings appear as white ringed elevation surrounded with netlike vessel.
- **Secretory phase** Endometrium is lush and velvety.
- **Hyperplasia**- Thick hyper-vascular friable mucosa, and polypoid in appearance, further classified as simple or atypical by the pathologists
- **Polyp**- Soft intracavitary formation, which was easily mobilized and covered by mucosa with endometrial gland and no distended vascular network.
- **Fibroid**- Firm intracavitary formation with thin endometrial lining and superficial large blood vessels.
- **Endometritis**- Irregular proliferation of glands and the presence of chronic inflammatory cells e.g. plasma cells, macrophages, and lymphocyte in the endometrial stroma.

After tabulating the findings of Hysteroscopy, it was compared with histopathological diagnosis and the sensitivity, specificity, positive predictive value and negative predictive value of Hysteroscopy were calculated and analyzed.

**Observations and Results**

A prospective study conducted on 50 perimenopausal women with abnormal uterine bleeding to evaluate the efficacy and accuracy of Hysteroscopy.

**Table No. 1** - Distribution of Patient According to Age Group

| Age   | No. of Patients | Percentage |
|-------|----------------|------------|
| 40-44 | 24             | 48%        |
| 45-49 | 19             | 38%        |
| 50-55 | 7              | 14%        |
| Total | 50             | 100%       |

In this study the age of patients ranged from 40-55 yr. Mean age was 44.3 yr. The proportion of patient in various age group categories is as follows 40-44 yrs., 45-49 yrs. and 50-55 yrs. 48%, 38%, 14% respectively. Majority 48% patients were in age group of 40-44 yrs. and minimum 14% in age group of 50-55 yr.
In study population, 28 patients (56%) belonged to rural background and 22 patients (44%) from the urban area.

### Table No. 3- Distribution According to Parity

| Parity       | No | %  |
|--------------|----|----|
| Nulliparous  | 2  | 4  |
| Primiparous  | 1  | 2  |
| Multiparous  | 47 | 94 |
| **Total**    | 50 | 100|

In study population, 47/50 patients (94%) were multiparous, 2/50 (4%) were nulliparous, and 1/50 (2%) were primiparous. So commonest affected patients were para 2 and more.

### Table No. 4 Distribution of Cases According to Socioeconomic Status

| Class | SE Stat | No | %  |
|-------|---------|----|----|
| I     | Upper   | 3  | 6  |
| II    | Upper Middle | 2 | 4  |
| III   | Lower Middle | 28 | 56 |
| IV    | Upper Lower | 8 | 16 |
| V     | Lower    | 9  | 18 |
| **Total** |      | 50 | 100|

In current study maximum no of cases belonged to class III socioeconomic strata (56%). Rest of patients according to socioeconomic class were in class I (6%), Class II (4%), class IV (16%) and class V (18%) respectively.

### Table no. 5 Distribution of cases according to the clinical presentation

| Bleeding Pattern           | No. of Patient | Percentage |
|---------------------------|----------------|------------|
| Heavy Menstrual Bleeding   | 25             | 50%        |
| Intermediate Menstrual Bleeding | 9          | 18%        |
| Frequent Bleeding          | 7              | 14%        |
| Heavy Prolonged Bleeding   | 3              | 6%         |
| Irregular Menstrual Bleeding | 6           | 12%        |
| **Total**                  | 50             | 100%       |

Out of 50 cases; 50% presented with heavy menstrual bleeding, this is revised terminology by AICOG which correspond to menorrhagia, while frequent bleeding in (14%) of patients, intermenstrual bleeding in (18%) and heavy prolonged bleeding in (6%) and irregular bleeding in (12%) of patients.

### Table No. 6 Distribution of Cases According to the Associated Complains

| Associated Complain        | No. | %  |
|----------------------------|-----|----|
| Pain Abdomen               | 22  | 44 |
| Dyspareunia                | 3   | 6  |
| Vaginal Discharge          | 4   | 8  |
| Dysmenorrhrea              | 5   | 10 |
| No other Complaints       | 16  | 32 |
| **Total**                  | 50  | 100|

Out of 50 cases of AUB, maximum no. of patients (44%) presented with complaints of pain abdomen, (10%) dysmenorrhea, (8%) vaginal discharge with and (6%) with dyspareunia, (32%) of patients had no associated complains.

### Table No. 7 Distribution of Cases According the Past History of Contraception

| Type of Contraception | No. of Patients | %  |
|-----------------------|-----------------|----|
| Barrier               | 4               | 8  |
| No contraception      | 13              | 26 |
| Sterilization         | 28              | 56 |
| Oral pills            | 3               | 6  |
| IUCD Users            | 2               | 4  |
| **Total**             | 50              | 100|

In study population, out of 50 cases (56%) patients had tubal sterilization done in the past, 26% patients had not used any contraception, 8% patients used barrier contraception, 6% were OCP user and 4% had used Cu-T as a contraceptive method.

### Table No. 8 Distribution of Cases According to Hemoglobin Level

| Hb | No. of Patients | %  |
|----|----------------|----|
| <8 | 10             | 20 |
| 8-9| 28             | 56 |
| 9-10| 8              | 16 |
| >10| 4              | 8  |
| **Total** |                | 100|

Out of total 92% patients had hemoglobin < 10 gm%. 56% of patients had hemoglobin level between 8-9 gm%.20% of cases had Hb level < 8 gm%, 16% of patients had Hb between 9-10 gm%. 8% of patients had Hb >10 gm%. It correlated with high incidence of anemia in patients with AUB.
Table No. 9 Diagnosis of Endometrial Findings in AUB Patients by Hysteroscopy

| Endometrial Finding on Hysteroscopy | No. of Cases | Percentage |
|------------------------------------|--------------|------------|
| Normal                             | 28           | 56%        |
| Endometrial Hyperplasia            | 10           | 20%        |
| Endometrial Polyp                  | 8            | 16%        |
| Sub mucosal Fibroid                | 4            | 8%         |
| Total                              | 50           | 100%       |

Table No. 9 shows hysteroscopic finding among AUB patient. It showed that out of 50 cases, 28/50 (56%) were normal and remaining 22/50(44%) showed abnormal endometrial finding, out of which Endometrial hyperplasia seen in (20%) cases, polyp in (16%) and sub mucosal fibroid in (8%) cases.

Table No. 10 Comparison of Hysteroscopy Findings with Histopathology

| Hysteroscopy Findings | Total | Normal | Endometrial Hyperplasia | Endometrial Polyp | Sub Mucosal Fibroid | Adenomyosis |
|-----------------------|-------|--------|--------------------------|-------------------|---------------------|-------------|
| Normal(proliferative/secretory) | 28    | 22     | 3                        | 0                 | 0                   | 3           |
| Endometrial Hyperplasia | 10    | 2      | 8                        | 0                 | 0                   | 0           |
| Endometrial Polyp      | 8     | 0      | 8                        | 0                 | 4                   | 0           |
| Sub Mucosal Fibroid    | 4     | 0      | 0                        | 0                 | 4                   | 0           |
| Grand Total            | 50    | 24     | 11                       | 8                 | 4                   | 3           |

While comparing hysteroscopic findings with histopathology, Hysteroscopy showed 28 cases (56%) as normal finding. On histopathology out of these 28 cases; 22 cases had normal endometrial finding, 3 cases showed endometrial hyperplasia and 3 cases had adenomyosis. Diagnostic accuracy of hysteroscopy for normal endometrium (proliferative/secretory) came out to be 90%.

Out of 10 cases showing endometrial hyperplasia on hysteroscopy; in histopathology 8 cases had endometrial hyperplasia, 2 cases showed normal endometrium. Diagnostic accuracy of hysteroscopy for endometrial hyperplasia came out to be 84%.

8 cases of polyp were diagnosed by hysteroscopy. Same finding confirmed on histopathology in all 8 cases. Diagnostic accuracy of hysteroscopy for polyp came out to be 100%.

4 cases of sub mucosal fibroid diagnosed by hysteroscopy out of these all had fibroid on histopathology. One confirmed on histopathology (hysteroscopic myomectomy) and rest 3 was confirmed on hysterectomy specimen. So, considering final diagnosis, diagnostic accuracy of hysteroscopy was 100%.

After confirming the diagnosis, treatment was given to the patients

Table No. 11 True and False Findings of Hysteroscopy on Comparison with Histopathology

| Endometrial Pathology | Hysteroscopy Findings |
|-----------------------|-----------------------|
|                       | TP        | TN        | FP        | FN        |
| Normal (24)           | 22        | 20        | 6         | 2         |
| Endometrial Hyperplasia (11) | 8 | 37    | 2        | 3         |
| Endometrial Polyp (8) | 8         | 42        | 0         | 0         |
| Sub Mucosal Fibroid (4) | 4 | 46        | 0         | 0         |

Out of 11 cases of endometrial hyperplasia on histopathology, hysteroscopy identified 8 cases correctly as endometrial hyperplasia and 3 cases as normal endometrial finding leads to 3 false negative. Out of 8 cases of endometrial polyp on histopathology, hysteroscopy identified all 8 cases as true positive. Out of 4 cases of sub mucosal fibroid on hysteroscopy, hysteroscopy identified all 4 cases as true positive.
Table no 12 showed that hysteroscopy has 100% sensitive and 100% specific for **endometrial polyp** and **sub mucosal fibroid** indicating that hysteroscopy is the best modality for diagnosing intrauterine pathologies.

The sensitivity, specificity, PPV, NPV for **Endometrial hyperplasia** came out to be 72.72%, 94.87%, 88.88%, 92.5% respectively. So, hysteroscopy is less sensitive for diagnosing Endometrial Hyperplasia.

The sensitivity, specificity, PPV, NPV for diagnosing **normal endometrium** came out to be 91.66%, 76.92%, 78.57% and 90.90% respectively

### Discussion
Abnormal uterine bleeding is most common gynecological complaint among women in perimenopausal age group.

### Distribution according to Age
In our study maximum (48%) no of cases were between age group of 40-44yrs. and 38% of cases between age group of 45-49 yr. Mean age was 44.3 yr. This suggests abnormal uterine bleeding is common in perimenopausal women. Reethu Varadarajan et al\(^\text{11}\) reported maximum number of cases (56.0 %) falling in the age group of 40 – 43 yrs. Urvashi Verma et al\(^\text{13}\) also observed 41% of cases belonged to age group in 44 to 47 years.

Although around 80% of cases are attributed to anovulatory bleeding, a proportion of cases are because of structural, premalignant and malignant condition, hence a meticulous and systematic screening for the pathology is a must. Continuous evaluation of various non-invasive modalities of investigation procedures for perimenopausal bleeding should be undertaken.

### Distribution According to Socioeconomic Status
In my study analysis according to socioeconomic status of the participants showed that most of them (56%) belonged to socioeconomic class III and 16% were from class IV. It was comparable to Urvashi Verma et al\(^\text{13}\) who found that more than 50% belonged to socioeconomic class III and IV. Most of population in India belongs to lower socio-economic status class III, IV as per modified Kuppuswamy scale.

### Distribution according to Parity-
My study analysis revealed that most of patients were multiparous (94%).In the study by Jonathan Arnold et al\(^\text{14}\) approximately 90% women were multiparous, similarly Dasgupta Subhankar et al\(^\text{15}\) showed 88.5% patients being multiparous in their study, this is suggestive that multiparty and AUB may be correlated.

### Distribution According to Bleeding Pattern
In our study, the most common bleeding pattern was **heavy menstrual bleeding** (50%) which was comparable to the study by Shobha S. et al\(^\text{16}\). They had 46.5% patients presenting with menorrhagia.

Saroj A. et al\(^\text{17}\) also observed; menorrhagia (46.86%) being the most common menstrual complain. Jonathan Arnold et al\(^\text{14}\) also reported Heavy menstrual bleeding (HMB) in maximum no. of cases (43.7%). G.L. Shobhita et al\(^\text{18}\) showed menorrhagia in (40%) of cases.

### Endometrial Finding on Hysteroscopy
In current study, hysteroscopic showed normal endometrium in 56% of patients and showed endometrial pathology in 44% cases. Abnormal hysteroscopic findings were endometrial hyperplasia in 20% cases, polyp found in 16% cases and sub mucosal fibroid in 8% of cases. Sheetal et al\(^\text{19}\), found hyperplasia in 18%, endometrial polyp 9%, and sub mucosal myoma 11%.

In our study the incidence of other pathological lesion such as polyp and sub mucosal fibroid were

| Condition                  | Sensitivity | Specificity | PPV   | NPV   | Diagnostic accuracy |
|----------------------------|-------------|-------------|-------|-------|---------------------|
| Normal                     | 91.66       | 76.92       | 78.57 | 90.90 | 90%                 |
| Endometrial Hyperplasia    | 72.72       | 94.87       | 88.88 | 92.5  | 84%                 |
| Endometrial Polyp          | 100         | 100         | 100   | 100   | 100%                |
| Sub Mucosal Fibroid        | 100         | 100         | 100   | 100   | 100%                |

Table No. 12 Sensitivity, Specificity, PPV, NPV of Hysteroscopy
comparable with the study by Veena B.T. et al\textsuperscript{12} who detected sub mucus fibroid found in 6.7\% and polyps in 15\% of cases by hysteroscopy. Astudillo et al\textsuperscript{20} and Sciarra JJ et al\textsuperscript{21} also had similar distribution of the intra-cavitary lesions. Out of 8 cases of endometrial polyp all 8 were diagnosed on hysteroscopy and all 4 cases of sub mucosal fibroid diagnosed by hysteroscopy were confirmed on histopathology. It showed that hysteroscopy has very high sensitivity (100\%) and specificity (100\%), diagnostic accuracy (100\%) for intra uterine pathology such as polyp and sub mucosal fibroid.

**Endometrial hyperplasia**

In present study the sensitivity, specificity, PPV, NPV and diagnostic accuracy of hysteroscopy for endometrial hyperplasia was 72.72\%, 94.87\%, 88.88\%, 92.5\% and 84\% respectively.

Sheetal et al\textsuperscript{19} showed hysteroscopic diagnostic accuracy for endometrial hyperplasia 72\%. Sensitivity, specificity, positive predictive value and negative predictive value of hysteroscopy for hyperplasia were 75\%, 92.5\%, 71.4\% and 93.67\%, respectively.

Loverro et al\textsuperscript{22} stated the sensitivity, specificity, positive predictive value and negative predictive value of hysteroscopy for hyperplasia were 98\%, 95\%, 63\% and 99\%, respectively, for endometrial hyperplasia.

Arslan et al\textsuperscript{23} showed positive predictive value was 71.4\% and negative predictive value was 95.4\% in diagnosis of endometrial hyperplasia.

**Endometrial polyp**

In present study the sensitivity, specificity, PPV, NPV was 100\% for polyp and sub mucosal fibroid in hysteroscopy. It correlates with the findings of Sheetal et al\textsuperscript{19} in which sensitivity, specificity, positive predictive value and negative predictive value of hysteroscopy for endometrial polyp was 100\%.

Haller et al\textsuperscript{24} reported sensitivity and specificity of 100\% and 96.7\%, respectively. Panda et al\textsuperscript{25} reported diagnostic accuracy of 100\% in for polyp. Acharya V et al\textsuperscript{26} had observed sensitivity and specificity of hysteroscopy for endometrial polyp as 100\% each.

Chhikara et al\textsuperscript{27} showed for endometrial polyps, the sensitivity and specificity being 88.8\% and 97.5\% respectively.

**Submucous fibroid**

The sensitivity and specificity of the procedure was 100\% for sub mucous fibroids.

Panda et al\textsuperscript{25}, Acharya V et al\textsuperscript{26} showed the sensitivity and specificity of hysteroscopy for sub mucous fibroid was 100\%.

Sheetal et al\textsuperscript{19} showed the sensitivity, specificity, positive predictive value and negative predictive value of hysteroscopy for fibroid was 100\% each.

In conclusion, this study demonstrates that hysteroscopy remains the best option for the assessment of endometrium owing to its established accuracy. It allows direct visualization of the cavity and sampling for histopathological examination.

**Overall efficacy of Hysteroscopy in Other Studies**

| Study               | Procedure  | Sensitivity | Specificity | PPV    | NPV    |
|---------------------|------------|-------------|-------------|--------|--------|
| Urvashi et al\textsuperscript{13} | Hysteroscopy | 89.79       | 97.56       | 97.95  | 90.56  |
| Ritu Mishra et al\textsuperscript{28} | Hysteroscopy | 78.3        | 84.7        | 85.4   | 81     |
| Present study       | Hysteroscopy | 89.36       | 94.77       | 84.00  | 96.66  |

In the present study hysteroscopy had overall sensitivity, specificity, PPV, NPV 89.36\%, 94.77\%, 84\% & 96.66\%. The sensitivity, specificity, PPV, NPV of our study was fairly comparable with the study of Urvashi et al\textsuperscript{50} & Ritu et al\textsuperscript{73}.

**Conclusion**

Abnormal uterine bleeding prevails as an important and common gynecological ailment. In my study, we concluded that out of all enrolled patients; 48\% had normal endometrium, and 52\% had abnormal finding of which Endometrial Hyperplasia found in 22\%, Polyp in 16\%, Sub mucosal Fibroid in 8\%, and adenomyosis in 6\% of cases. The sensitivity, specificity, PPV, NPV of hysteroscopy was 89.36\%, 94.77\%, 84\% & 96.66\% respectively. Hysteroscopy showed 100\%
diagnostic accuracy for intrauterine pathologies like polyp and submucous fibroid. The results showed that hysteroscopy is an important tool in the diagnosis of various endometrial and intrauterine lesions, with high sensitivity and specificity, and low false negativity. Hysteroscopy is a valuable, simple, low-risk technique which allows an adequate visualization of the entire uterine cavity and prompt diagnosis and treatment in the same sitting of specific intrauterine pathologies. Thus, Hysteroscopy can be considered a gold standard for diagnosis of intrauterine pathologies. It does not substitute other diagnostic procedures; rather it complements them.

For management of AUB patients we can go for screening with TVS followed hysteroscopic according to the pathology detected in TVS. Hysteroscopy should be done prior to subjecting the women with AUB to major operative procedures.

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