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Uterine Artery Embolisation In Symptomatic Uterine Fibroid

Dr.Princey Rajakumari [1], Dr.Banupriya[2]

[1](Assistant professor, Department of OBG, Coimbatore Medical College Hospital, Coimbatore, India)
[2](Assistant professor, Department of OBG, Coimbatore Medical College Hospital, Coimbatore, India)

Abstract: *Fibroid is the commonest benign tumour of uterus in reproductive age women. It causes symptoms like menorrhagia, dysmenorrhoea, pressure effects, infertility etc. impairing the women's day today activity. Uterine artery embolism is an emerging tecniqunic which is a non invasive procedure with short hospitalisation and early recovery. It preserves uterus and also improves the symptoms. This study is a prospective interventional trial which is done to find the effectiveness of the procedure in terms of improvement in symptoms like menorrhagia, dysmenorrhoea and pressure symptoms. This study also analyses the technical difficulties encountered in the procedure, complications during and after the procedure. 30 eligible patients are subjected to UAE after initial evaluation. From this study we have found that Uterine Artery Embolisation for the patients having symptomatic uterine fibroid is an effective and safe alternate treatment with significant reduction in patient's symptoms and good patient's satisfaction. It has less failure rates in short term follow up. Single femoral puncture technique can be used to embolise both uterine arteries successfully in most of the patients.. This procedure is safe and has good patient's tolerance, short recovery time, quick and sustained symptomatic improvement. Careful selection of cases and proper counselling before embolisation can bring maximum success to the procedure.*

Keywords - *Fibroids, uterine artery embolisation, uterine fibroid embolistion, seldingers technique, menorrhagia, dysmenorrhoea*

I. Introduction

Fibroid (also called uterine leiomyoma, myoma, leiofibromyoma, fibroleiomyoma and fibroma) is a benign tumour that originates from the smooth muscles of myometrium and the accompanying connective tissue of the uterus. Fibroids are the most common benign tumour in females and typically found during the middle and later reproductive years seen in 40-50% of women older than 35 years [1]. It is estimated to occur in 40% of menstruating women older than 50 years. Symptoms caused by uterine fibroids are frequent indication for hysterectomy. Fibroids are often multiple. Most patients with uterine fibroids are asymptomatic [2].

Most common presenting symptoms of fibroids are Abnormal uterine bleeding,dysmenorrhoea,pelvic pain possibly resulting from intramural degeneration, torsion of pedunculated fibroid or uterine contractions.Pelvic pressure and abdominal distension in case of large fibroid which may manifest as genitourinary dysfunction like increased urinary frequency, acute urinary retention,flank pain resulting from urethral compression and hydronephrosis. Infertility is caused by distortion of uterine anatomy. Rarely it may also cause lower extremity oedema, constipation, or intestinal obstruction.

According to the location, fibroids are called as Intramural fibroids, Subserosal fibroid (sometimes pedunculated), Sub mucosal fibroids and cervical fibroids. Intra mural fibroids are the most common type causing menorrhagia and dysmenorrhoea. These intra mural fibroids can be treated with uterine fibroid embolisation.

Various medical and surgical therapies are used to treat fibroids. Medical therapy includes hypo estrogenic drugs, which causes temporary reduction in size and relief of symptoms. Surgical treatment includes myomectomy or hysterectomy. Uterine fibroid is one of the leading causes for hysterectomy today in India and worldwide.

Transcatheter embolisation of the uterine arteries for symptomatic fibroids has become an increasingly important alternative treatment. It is highly effective and well tolerated by most patients. Most notably, uterine artery embolisation is minimally invasive associated with a short recovery period and is uterine sparing. Estimated 13,000-14,000 UFE procedures are performed annually in U.S. (as of 2004). In India uterine fibroid embolization is less popular and done in very few centres. This study is to determine the benefits and effectiveness of uterine artery embolization in symptomatic uterine fibroid and use the same as an alternate primary treatment for uterine fibroids.

II. Aim

The aim of this study is to analyse the effectiveness, technique, complication and outcome after uterine artery embolisation in patients with symptomatic uterine fibroid.

III. Uterine Fibroid Embolisation

Embolization[3] is defined as the "therapeutic introduction of various substances into the circulation to occlude selective vessels, either to arrest or prevent haemorrhage, to devitalize a structure, tumour or organ."

3.1. PROCEDURE

Uterine fibroid embolisation is a minimally invasive outpatient procedure done under local anaesthesia with or without sedation. Selective catheterisation is done by **seldinger technique** using multipurpose 4F or 5F cobra catheter. Unilateral or bilateral catheterisation made to embolise both uterine arteries. The uterine artery is more easily accessed from the contra lateral femoral artery. Angiography and embolisation is performed using an 800ma conventional angiographic unit (SIEMENS). A bilateral catheterisation is also used to reduce the time taken for the procedure [4]. A **flush aortogram** is taken initially by placing catheter at L1 level to detect any aberrant supply to the uterus. Catheter passed to the contra lateral common iliac artery, internal iliac then anterior branch of internal iliac artery and to the uterine artery. Catheter is advanced under fluoroscopic guidance. Catheter is placed in the horizontal part of uterine artery beyond the origin of descending cervical branch. After confirming the position of the catheter by injecting contrast material, embolisation done using PVA particles or Gel form.

Similar procedure is repeated on the other side. After embolisation vascularity to the fibroid is reduced and standing column of contrast seen is in uterine artery. A tight plaster is applied over the punctured site. Procedure takes 1/2-1 hr to complete. Patient is observed for 24 hrs.

3.2. HOW UFE ACTS:

Uterine fibroid embolisation acts mainly by occluding the capillaries and arterioles since fibroid supplied by end arteries without much anastamosis. This causes shrinkage of the tumour and stops appearance of new fibroids as per long term follow up studies. Blood supply to normal myometrium is not much compromised because of extensive anastamotic network.

3.3. EMBOLIC MATERIAL:

Gelatin sponge and **poly vinyl alcohol** are the commonly used embolic materials. **Gel foam**, a gelatine sponge material, which is cut into small pieces that are injected into an artery and float downstream until they can go no further. After a period ranging from a few days to two weeks, the material dissolves. Particulate agents, including **poly vinyl alcohol** (PVA) and gelatin-impregnated acrylic polymer spheres, which are suspended in liquid is also used instead of Gel form. These agents occlude vessels permanently. They are commonly used in the treatment of uterine fibroid.

3.4. END POINT OF EMBOLISATION:

- Occlusion of the identifiable vessels supplying the fibroids with preservation of as much of the normal uterine flow.
- Evidence of a standing column of contrast in the uterine artery and reflux towards the uterine artery origin or into the internal iliac artery.
- Cessation of flow in the ascending uterine artery with residual flow in the lower uterine segment supplying the normal myometrium.

IV. Materials And Methods

In this study 32 patients with fibroid uterus having at least one of the following symptoms are selected

4.1. INCLUSION CRITERIA

1. Women with symptomatic fibroid (menstrual disturbances or pressure symptoms due to size or pain) who want to retain their uterus and avoid surgery.
2. Solitary or multiple intramural fibroids of less than 7 cm.
3. Parous women who completed family and age less than 40 yrs.
4. Women who give consent to undergo uterine artery embolisation and participate in the study.

4.2. EXCLUSION CRITERIA

1. Women with asymptomatic fibroid.
2. Infertile women or parous women who want to conserve uterus for future pregnancy.
3. Fibroids of more than 7 cm or with degenerative changes or hypo vascularity on Doppler study.
4. Sub mucous or pedunculated Subserosal fibroid.

5. Previous history of anaphylaxis to contrast.
6. Systemic illness like HIV, HbsAg +ve, abnormal renal profile, Coagulation disorders.

V. Methodology

A detailed history was taken to know the severity of symptoms. Menorrhagia was assessed by **Pictorial Blood Loss Assessment Chart** (Hallberg et al.)[5]. Patients were asked to keep a detailed menstrual calendar denoting the number of pads used, soakage of each pad, duration of flow and passage of clots.
Dysmenorrhoea was assessed by **Visual analogue scale** [6] using a 10-cm line represented the continuum.The participants were asked to rate the degree of pain by making a mark on the line.

Pressure symptoms were assessed by the presence or the absence of lower abdominal heaviness, increased frequency of micturation or constipation.

5.1. PROCEDURE:

5.1.1. PRE ANAESTHETICS

- Inj Dexamethasone 8mg I.V Stat
- Inj. Pheniramine Maleate I amp I.M Stat
- Inj. Atropine Iamp I.V.Stat

Given half ah hour before the procedure.

5.1.2. ANTI BIOTIC PROPHYLAXIS:

- Inj Ampicillin 1gm I.V (ATD)

5.1.3. ANESTHESIA/ SEDATION:

- Inj Tramadol 1 amp IM

5.1.4. PATIENT POSITION: Supine

5.1.5. APPROACH: Percutaneous transfemoral approach

5.2. POST PROCEDURE EVENTS:

Patients were observed in high dependence ward for 6 hrs then at least 48 hrs in the routine wards. All the patients were carefully observed for any complications like groin haematoma /retroperitoneal haematoma. Vitals were checked. Patients were kept nil per oral for 4 hours. They were advised bed rest for 6 hours and then ambulated. Patients were discharged after 48-72 hrs.

All of them were advised to maintain menstrual calendar in detail regarding the duration, number of pads soiled, clots passed and associated pain after discharge.

5.4. FOLLOW UP:

At the end of 3rd month patients were called and enquired about their menstruation, dysmenorrhoea and pressure symptom. USG Pelvis performed to know the size & volume of fibroid. Similarly at 6th month patients were called, enquired and a review USG was taken.

VI. Analysis and results

32 patients with uterine fibroid who were fit according to the inclusion criteria were taken up for this study. Embolisation was done after adequate counselling and getting informed written consent. Successful embolisation was done in 30 patients. Therefore data was analysed for 30 patients.

6.1. AGE

In this study women below the age of 40 yrs are selected for UFE. Age distribution of the study population is given below.
Mean age of the study population was 32.43 yrs and range was 26-39yrs.

Table: 1."Age distribution of subjects"

Age Group	Frequency	%
26-30	10	33.33
31-35	17	56.67
36-40	03	10.00
Total	30	100.00

6.2. INDICATION FOR EMBOLISATION:

Among 30 patients 23 (76.67%) patients preferred uterine artery embolisation than Hysterectomy. Out of 7 patients 5 (16.67%) were severely anaemic because of menorrhagia so preferred uterine artery embolisation for anaesthetic risks. One patient had undergone two laparotomies previously hence preferred uterine artery

embolisation for her menorrhagia. One patient was morbidly obese. She preferred uterine artery embolisation considering the risk of thrombo embolism, wound infection etc...

Table:2 "Indications- Distribution of subjects"		
Indications	Frequency (No. of subjects)	%
Opted	23	76.67
Anaemia	05	16.67
Obesity	01	03.33
Previous surgery	01	03.33
Total subjects	30	100.00

6.3. PRESENTING COMPLAINTS:

Among menorrhagia, dysmenorrhoea and pressure symptoms, menorrhagia was the most common presenting symptom. It was present in all the patients. Dysmenorrhoea was present in 23 (76.66%) of the subjects. Pressure symptoms was present in 6 (20%) of the patients.

Table:3 "Symptoms- Distribution of subjects"		
Symptoms	Frequency	%
Menorrhagia	30	100.00
Dysmenorrhoea	23	76.66
Pressure symptom	06	20.00

6.4. MENORRHAGIA:

Menorrhagia was present in all of the subjects. Menorrhagia was assessed by Pictorial Blood Loss Assessment[PBLA] Chart. As per **Higham et al**[7] who analysed pictorial blood loss, PBAC scoring of >100 is diagnostic of menorrhagia, that is blood loss of >80ml with specificity and sensitivity of >80. All patient had Pictorial Blood Loss Assessment scoring of >100. Average blood loss scoring in this study was 202.66 and ranges from 100-315.Pictorial Blood Loss Assessment scoring distribution of the patients before treatment is given below.

Table 4: "Menorrhagia distribution"		
PBLA Scoring	Samples	%
100-150	7	23.33
151-200	7	23.33
201-250	11	36.66
>250	05	16.66
Total	30	100.00

6.5. DYSMENORRHOEA

Dysmenorrhoea was assessed by Visual Analogue Scale [6]. Before embolisation mild dysmenorrhoea was present in 2 patients, moderate dysmenorrhoea was present in 10 patients and severe dysmenorrhoea in 11 patients.

Table: 5. "Dysmenorrhoea Before Treatment"		
Grading	No of Subjects	%
No dysmenorrhoea	07	23.33
Mild dysmenorrhoea	02	06.67
Moderate dysmenorrhoea	10	33.33
Severe dysmenorrhoea	11	36.67
Total	30	100.00

6.6. PRESSURE SYMPTOMS:

Pressure symptoms present in 6 of the patients (20%).4 patients had increased frequency of micturation and 2 patients had feeling of lower abdominal heaviness.

Table:6"Distribution Of Pressure Symptom"		
Pressure symptoms	No of subjects	%
No pressure symptoms	24	80.00
Frequency of micturation	04	13.33
Lower abdominal heaviness	02	06.67
Total	30	100.00

6.7. SIZE AND VOLUME:

Fibroid volumes are determined with the formula $A \times B \times C \times 0.523$, where *A*, *B*, and *C* are the dimensions in the three orientations in ultrasound assuming the fibroid has an ellipsoid shape [8] .Volume of fibroid in this study ranges from 40.01 - 276.14 cu cm. Average volume of fibroid before treatment was 104 cu cm. Largest size of fibroid in this study was 10x 8x6.6cm. Volume distribution of fibroid is given below.

Table: 7. " Volume Distribution Of Fibroids "		
Volume of fibroid (cu cm)	No of subjects	%
<50	05	16.67
50-100	11	36.67
100-150	08	26.66
150-200	05	16.67
>200	01	03.33
Total	30	100.00

6.8. TECHNICAL DIFFICULTIES:

Technical difficulties was seen in 3 (9.99%) of the patients. Catheterisation of uterine artery was difficult because of vasospasm in 3 patients. Unilateral embolisation was done in one patient and other two patients catheterisation could not be done on both sides and the procedure abandoned. For another patient unilateral embolisation done because of sub intimal dissection on one side.

Table: 8. Technical difficulties		
Technical difficulties	No of subjects	%
Bilateral embolisation	28	87.5
Unilateral embolisation	2	6.25
Unsuccessful catheterisation	2	6.25
Total	32	

6.9. COMPLICATIONS:

Complication rate in this study was 3.12% (serious complication).One case of sub-intimal dissection was seen. For her embolisation was successfully done in the contra lateral side. Then on catheterising the ipsi-lateral side sub-intimal dissection occurred and further procedure abandoned. Inj heparin 5000 u sc BD was started. No long term sequela was seen in that patient. No other major complication occurred during the procedure. As explained earlier 3 patients had vasospasm.

Table: 9. Complications During Procedure		
Category complication	No. Of Subjects	%
Vasospasm	03	09.38
Subintimal dissection	01	03.12
No Complication	28	87.50
Total	32	100.00

6.10. POST PROCEDURE EVENTS:

90% of the patients complained of pain in the lower abdominal and low back ache.20% had vomiting and10% had fever. All these complications were self limiting. One patient had post embolisation syndrome (PES) and was re-admitted after a week.

Table: 10. Post Procedural Events		
Complication	No Of Patients	%
Pain	27	90
Vomiting	6	20
Fever	3	9.99
PES	1	3.33

6.11. DURATION OF HOSPITAL STAY

Average duration of hospital stay for the patients who underwent UFE was 2.6 days. Range of duration of hospital stay was 3 to 7days. One patient who had sub intimal dissection stayed for 7 days. All other patients discharged on 2nd or 3rd day.

Table: 11. Distribution Of Duration of Hospital Stay		
Duration	No Of Patients	%
2 Days	16	53.34
3days	13	43.33
>=4 Days	1	3.33

6.12. FOLLOW UP ANALYSIS:

At the end of 3rd month all the 30 patients came for follow up. Their menstrual calendar was analysed, symptoms enquired and clinical examination was done. USG was done for all patients to assess the size and volume of the fibroid. Only 12 patients completed 6th month follow up. Others yet to come for follow up at 6 months.

6.12.1. MENORRHAGIA ON FOLLOW UP

At 3 months menstrual blood loss was significantly reduced. 83% had moderate to significant improvement in their mean blood loss. Pictorial blood loss scoring reduction ranges from 10 to 95% at the 3rd month and 45 to 76% at the 6th month. By paired't' test reduction in blood loss at 3 months was highly significant with *p<0.00001* .

Table: 12. Distribution of Improvement in menorrhagia After 3 Months		
Improvement in the blood loss	No. of Subjects	%
Worsening < 0	0	0
Remaining the same 0-10%	0	0
Mild-10-30%	05	16.67
Moderate-30-50%	16	53.33
Good >=50%	09	30.00
Total Subjects	30	100.00

At 6 months menorrhagia markedly reduced. All the patient had PBLA scoring of <100 that is no menorrhagia after 6 months.

6.12.2. DYSMENORRHOEA ON FOLLOW UP:

Among 23 patients presented with dysmenorrhoea significant improvement in dysmenorrhoea seen in 87% of patients. Only 2 of the patient's dysmenorrhoea remained the same at 3 months. At the end of 6 months none of the patients had severe dysmenorrhoea.

Table: 13. Improvement in dysmenorrhoea after 3 months		
	Before Procedure	After 3 Months
Nil	7	7
Mild (1-4)	2	14
Moderate (5-7)	10	9
Severe (>7)	11	0
	30	30

6.12.3. VOLUME CHANGES:

In this study, mean reduction in the volume at the 3rd month was 29.91% and at the 6th month was 46.66%. Range of volume reduction varied from 9 to 50% at 3 months and 27-65% at 6 months. Paired "t" test was used to analyse the volume change after 3 months. It was highly significant with p value of <0.0001 at 3 months. In this study moderate to marked reduction in dominant fibroid volume was seen in 40% of the patients at 3rd month and 91% at 6th month

Table: 14. Volume Reduction of Fibroid After 3 Months		
	No. Of Subjects	%
Worsening	0	0
Remaining The Same 0-10	01	03.33
Mild-10-30	17	56.67
Moderate-30-50	12	40.00
Total Subjects	30	100.00

Table: 15. Reduction In Fibroid Volume After 6 Months		
	No. Of Subjects	%
Worsening	0	0
Remaining The Same 0-10	0	0
Mild-10-30	1	08.33
Moderate-30-50	6	50.00
Good >=50	5	41.67
Total Subjects	12	100.00

6.12.4. VOLUME REDUCTION GELFOAM Vs PVA:

For embolisation we have used gel foam for 15 patients and poly vinyl alcohol for 15 patients. On analysing the volume reduction at 3 months, mean volume reduction for gel foam and poly vinyl alcohol was 27.86% and 31.95% respectively. By unpaired t test value p value was 1.15 (>0.5) which was insignificant.

6.12.5. PRESSURE SYMPTOMS:

In this study 6 of them had pressure symptoms. 4 had increased frequency of micturation. 2 had lower abdominal heaviness. Pressure symptoms disappeared at 3 months for all of them.

Table:16" Pressure Symptoms After Treatment"		
Pressure symptoms	Before treatment	3 months after treatment
Frequency of micturation	04	0
Lower abdominal heaviness	02	0
Total	6	nil

No long term complication seen in this study.

VII. Discussion

Fibroid uterus is one of the common benign gynaecological disorders encountered in the reproductive age women. Although various medical treatments available they are ineffective because of their side effects and temporary relief. Hence many young women forced to undergo hysterectomy at an early age. Uterine artery embolisation is a minimally invasive alternative primary treatment of fibroids with preservation of uterus. This

study was done to know the effectiveness, tolerability and complication of this procedure which can be used as primary procedure.

Samples were collected according to the inclusion and exclusion criteria. They were assessed in detail and contra-indications were ruled out. Totally 32 samples were taken for this study. For 2 patients embolisation could not be done because of vasospasm. Successful embolisation was done for 30 patients. Hence we have analysed data for 30 patients.

Out of 30, 23(76.67%) of them preferred UFE to hysterectomy. In the remaining samples, 5 (16.67) had severe anaemia, one had under gone previous surgery and one was morbidly obese thus preferred UAE to prevent surgical and other complications.

Majority of the patients opted to undergo Uterine Artery Embolisation because of the following benefits:

- Short duration of hospital stay.
- Simple procedure.
- Safe compared to hysterectomy as per previous studies
- Satisfactory results of the previous studies.
- Avoid surgical complications (Anaemic patients, obese patients and patients undergone previous surgery – anaesthetic risk, infection and injury to vital structure because of adhesion)

Mean **Age** of the study population was 32.43 years which ranges from 26-39. The study population below 40 years were selected because, as age increases associated problems like carcinoma of endometrium and ovarian pathologies increases which mandates surgical management. Above the age of 40 years 3% of myomas are associated with endometrial carcinoma[45]. Also in post menopausal women and peri menopausal women the fibroid size regresses after menopause because of its estrogens dependent nature.

Menorrhagia was present in all the patients which were assessed by Pictorial Blood Loss Assessment Chart. As per **Higham et al** [7] who analysed pictorial blood loss, PBAC scoring of >100 is diagnostic of menorrhagia, that is blood loss of >80ml with specificity and sensitivity of >80%. All patient in this study had Pictorial Blood Loss Assessment scoring of >100. Average blood loss scoring in this study was 202.66 and ranges from 100-315.

Dysmenorrhoea was present in 23(76.66%) of the subjects and was assessed by Visual Analogue Scale. Before embolisation mild dysmenorrhoea was present in 2(7%) patients, moderate dysmenorrhoea was present in 10(33.3%) patients and severe dysmenorrhoea in 11(37%) patients.

In this study **Pressure Symptoms** was present in only 6(20%) of the selected population. This may be because of the restriction of size of fibroid <7c.m.4 (13.33%) had increased frequency of micturation and 2(6.67%) had feeling of lower abdominal heaviness.

In this study, average **volume of fibroid** before embolisation is 104 cu.cm. Largest fibroid in the study population was 10x 8x6.2 cm & volume 274.14 cu.cm. Previously said large fibroids are associated with more complication. In our series we have not encountered any additional complications in larger fibroids. This correlates with the recent study by **Albret J Smeetsetal**[9] shows complications were not increased and clinical response is also good.

In this study **unilateral femoral puncture technique** was used in all patients. Bilateral femoral puncture with cross-over technique which was used initially for UAE was faster and needs shorter screening time than unilateral catheterization. However, with experience, ipsi-lateral catheterization of uterine artery can be carried out quickly and is widely practiced today. We have used unilateral femoral puncture technique, not encountered any complication related to femoral puncture and catheterisation. This correlated with the study, **Pelage JP, Soyer P, et al.** [10], found unilateral femoral puncture was safe and with lesser incidence of complications such as haematoma and dissection of arteries.

Pre procedural antibiotics and analgesics were given to all patients. None of the patients required any further sedatives or anaesthesia during the procedure.

Successful bilateral embolisation was done for 28 (87.5%) of the patients. **Technical difficulties** was seen in 4 (12.5%) of the patients. Catheterisation of uterine artery could not be done because of vasospasm. Unilateral embolisation was done in two patient and other two patients catheterisation could not be done on both sides and the procedure abandoned. This is comparable with **Brunereau et al.**[11] Who reported 84% successful catheterisation. **Pelage et al** [10], reported successful catheterisation in 92% of cases.

Serious complication rates in this study were 3.33% which is little higher compared to other studies. This can be attributed to smaller sample size. We have encountered one sub intimal dissection alone and no other serious complications like vascular perforation or allergy to contrast media noted. **Spice et al** [12] who published the largest series found an overall 8.5% short-term complication rate and a 1.25% serious complication rate. Infective complications have been noted in other studies which were not seen in this study. **Vashisht et al**. [13] reported one death due to septicaemia following UAE leading to multi organ failure. **Walker and Pelage** [14] have reported three (1%) infective complications leading to hysterectomy. Hence, pre-existing infection must be excluded and proper antibiotic cover must be given before UAE. Expulsion of

fibroids vaginally after UAE has been reported in 2.5% of patients by **Goodwin et al**. [15] . In this study, no such incidence was recorded.

Duration of the procedure varied from 45 minutes to 75 minutes. The average duration of the procedure was 65 minutes. This is comparable with results of previous researches. The mean total procedure time as reported by other investigators has been 78.4 min for bilateral approach [16] and 44.29[17] and 61[18] min for unilateral approach. **Fluoroscopic exposure time** was 45 min, which is more compared with reported times of 25.3[16], 13.69[17] and 18.9[18] min. In this study intermittent fluoroscopy was used to reduce the exposure.

Post Procedural Events: Majority of the patients (90%) complained of pain in the lower abdominal and low back ache. Pain subsided with NSAIDs. Rarely narcotic analgesics needed. 20% had vomiting and 10% had fever. All these complications were self limiting. Patients observed for 48 hours 72 hours and then discharged. None of the patients developed hematoma or any other serious complication in immediate post procedure period. One patient had post embolisation syndrome (PES) and was re-admitted after a week.

Patients were advised to take bed rest for 6 hrs, then minimal activity up to 24hrs, after that were ambulated well and observed in hospital. Patients without complications were discharged on the 2nd or 3rd day.

Mean **Duration of Hospitalisation** was 2.6 days in this study. Most of the patients were discharged on 2nd or 3rd day. Only one patient who had sub-intimal dissection was discharged on 7th day. She was treated with heparin 5000u sc BD. MRI Scan and Doppler flow was assessed and found to be normal. Another patient was readmitted with the complaints of fever and myalgia. She was treated with antibiotics & antipyretics and was investigated for infections which were negative. Patient recovered after 2 days and was discharged. Pain and vomiting was seen in most of the patients. Pain was confined to lower abdomen and back region and was reduced with NSAIDS. Duration of hospital stay is comparable with **Brunereau L, et al**. [11] who reported 2.3 days. In some hospitals the patients discharged after an overnight stay. This can also suggested in future, as there was no complication seen after 24 hrs.

Follow up: Patients are called at the end of 3 months and 6 months. Menorrhagia was assessed by Pictorial Blood Loss Assessment Chart and dysmenorrhoea by Visual analogue Scale.USG was done to know the size of fibroid.

In this study on the 3rd month follow up, there was significant **Improvement in Menorrhagia** (83% of patients) (*p<0.00001 highly significant).* No patients had worsening of menorrhagia. At 6 months all (100%) patients had PBLA scoring below 100 that is blood loss <80 ml. It was comparable to the study reported by **Ravina et al** [19] (81%) and **Goodwin et al.**[20] (81%). Improvement in blood loss ranges from 10 to 95 % at 3 months. At the 6th month the improvement in menorrhagia ranges from 45 to 76%.One (3.33%) patient had **Transient Amenorrhoea**. She resumed her menstruation 4 months after the procedure. No cases of permanent amenorrhoea seen in this study.

Similarly there was significant **Improvement in Dysmenorrhoea** seen in 87% of patients. Only 2 of the patient's dysmenorrhoea remained the same at 3 months. At the end of 6th month none of the patients had severe dysmenorrhoea. This results correlated with the findings of **Mahmood et al.** [21] from Stansford University who showed 74% had improvement in dysmenorrhoea.

Average **Volume Reduction** at the 3rd month was 29.91 % (*p<0.0001 highly significant)* and 6th month was 44.66%. Range of volume reduction varied from 9 to 50% at 3 months and 27-65% at 6 months. It comparable with that seen in the study by **Spies et al.**[22], who has reported 50% at 6th month and 78% at 1st year.

Gel foam Vs Poly Vinyl Alcohol as embolic agent: Among 30 patients in the study 15 of them were embolised with gel foam and remaining 15 was embolised with ploy vinyl alcohol particles of 350-500 µm size. On analysing the volume reduction, both was equally effective. This result is comparable with **Katz et al** [23] who studied the effectiveness of gelatin sponge pledgets versus polyvinyl alcohol for embolization. They concluded that materials are equally effective.

VIII. Conclusion

From this study we have found that Uterine Artery Embolisation for the patients having symptomatic uterine fibroid is an effective and safe alternate treatment with significant reduction in patient's symptoms and good patient's satisfaction. It has less failure rates in short term follow up. Although long term follow needed to confirm it. Single femoral puncture technique can be used to embolise both uterine arteries successfully in most of the patients. Both the embolizing agents (Gel foam & PVA) are equally effective in relieving the symptoms. This procedure has good patient's tolerance, short recovery time, quick and sustained symptomatic improvement. As the previous studies do not support future fertility it should be used with caution in patients who want future conception. Careful selection of cases and proper counselling before embolisation can bring maximum success to the procedure. This procedure may reduce the need for invasive surgery in many patients. From this study we conclude that UFE is a minimally invasive, safe and effective treatment for properly selected patients with uterine fibroids.

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