

1 Comparative Outcomes of Total Obstetric Hysterectomy Vs Supra-
2 cervical Obstetric Hysterectomy in cases of Placenta Previa along with
3 Placenta Accreta Spectrum

4 **Abstract**

5 **Background:** Placenta previa, particularly when associated with
6 placenta accreta spectrum (PAS), poses significant challenges in
7 obstetric care and increasing the risks of life-threatening maternal
8 hemorrhage.

9 **Aim-** To compare outcomes of total obstetric hysterectomy (TOH) and
10 supracervical obstetric hysterectomy (SCOH) in patients diagnosed with
11 placenta previa and PAS.

12 **Material & Methods:** Observational study at Pt. JNM Medical College
13 and Dr. BRAM Hospital, Raipur. Data taken of 136 cases of placenta
14 previa, with 32 patients undergoing obstetric hysterectomy, of which 19
15 had PAS. Cases classified into two groups: TOH (n=7) and SCOH
16 (n=12). Outcome variables were operative time, blood loss, maternal
17 morbidity and mortality.

18 **Results:** 59% OH were done in cases of placenta previa associated with
19 PAS. The incidence of Obstetric Hysterectomy due Placenta Previa with
20 PAS was 0.13%. The mean blood loss was higher in the TOH group
21 (1257 ± 408.6 mL) compared to the SCOH group (1100 ± 292.9 mL)
22 ($p=0.3$). The operative duration was longer for TOH (157 minutes) than

23 for SCOH (136 minutes, $p=0.4$). Postoperatively, complications such as
24 severe anemia were comparable (85% in TOH vs. 90% in SCOH).

25 Internal Iliac artery ligation prior to hysterectomy was associated with
26 higher mean blood loss (p Value 0.01) and higher operative time (p
27 Value 0.04). 2/19 cases lost their lives after hysterectomy. Mortality rate
28 was 10.5% and was associated with severe PAS.

29 **Conclusion:** The study highlights the high incidence of PAS in obstetric
30 hysterectomy. TOH and SCOH each have distinct advantages and risks
31 that must be weighed against patient-specific factors. Direct proceeding
32 to hysterectomy rather than after internal iliac artery ligation appear to
33 be associated with better maternal outcome.

34 **Key words:**

35 OH (Obstetric hysterectomy), TOH (Total obstetric hysterectomy,
36 SCOH (Supracervical hysterectomy), PP (Placenta previa), PAS
37 (Placenta Accreta Spectrum)

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43 **Introduction:** Placenta accreta syndrome (PAS) is a serious obstetric
44 complication characterized by abnormal placental attachment, which can
45 result in life-threatening hemorrhage and necessitates careful surgical
46 management ⁽¹⁾. In developed countries the incidence of Obstetric
47 Hysterectomy (OH) is 1/1000 deliveries whereas in developing
48 countries, this range is 1-5/1000 deliveries. The incidence of obstetric
49 hysterectomy is increasing with increasing rate of placenta accreta
50 spectrum over past four decades; which is likely due to a change in risk
51 factors ⁽²⁾. It is markedly noticed that previous caesarean section is
52 posing as the most important risk factor for PAS in cases of Placenta
53 previa. PAS may occur after any kind of procedure that causes damage
54 to the endometrium, including curettage, manual removal of the
55 placenta, uterine-artery embolization, or myomectomy ^(3,4).

56 In severe cases, PAS can lead to massive hemorrhage, often
57 necessitating an emergency obstetrical hysterectomy, a surgical
58 procedure involving the removal of the uterus after delivery or during
59 cesarean, is frequently required in cases of PAS and placenta previa to
60 control life-threatening bleeding. Since the first recorded obstetric
61 hysterectomy in the late 19th century, the procedure has evolved, with
62 types being performed: Subtotal, Supracervical and Total obstetric
63 hysterectomy (TOH) ^(5,6,7,8). The former preserves the cervix and offers
64 potential advantages in pelvic support and sexual function, while the
65 latter removes the entire uterus, reducing the risk of residual placental

66 tissue and other complications but potentially affecting long-term pelvic
67 health. However, there is ongoing debate about the relative benefits and
68 risks of SCOH versus TOH, particularly in cases where placenta previa
69 is complicated by PAS. Currently, the evidence regarding maternal and
70 fetal outcomes following these procedures remains inconclusive, and
71 data comparing the two in the context of PAS is limited. To address this
72 knowledge gap, this study aims to conduct a comprehensive comparative
73 analysis of maternal and fetal outcomes in patients undergoing SCOH
74 versus TOH for placenta previa with PAS. By evaluating key parameters
75 such as operative time, blood loss, maternal morbidity and mortality, this
76 research seeks to provide crucial insights into the optimal surgical
77 management of this high-risk obstetric population.

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79 **Objective:** To compare the outcomes of Total Obstetric Hysterectomy
80 (TOH) and Supracervical Obstetric Hysterectomy (SCOH) in cases of
81 Placenta Previa with Placenta Accreta Spectrum (PAS), and to study the
82 incidence, risk factors, and management strategies for PAS in the current
83 clinical setting.

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88 **Materials and Methodology**

89 This study was conducted in the Department of Obstetrics and
90 Gynaecology at Pt. JNM Medical College and Dr. Bhimrao Ambedkar
91 Hospital, Raipur, under Pt. Deendayal Upadhyay AYUSH University of
92 Medical Education. This observational, analytical study spanned from
93 November 2021 to December 2023 with up to 6-month follow-ups. All
94 antenatal patients diagnosed with placenta previa were included in the
95 study. Cases of obstetric hysterectomy due to placenta previa with
96 Placenta Accreta Spectrum (PAS) were thoroughly analysed based on
97 predefined criteria ⁽¹¹⁾. Data taken of 136 cases of placenta previa, with
98 32 patients undergoing obstetric hysterectomy, of which 19 had PAS.
99 Cases classified into two groups: TOH (n=7) and SCOH (n=12).
100 Outcome variables were operative time, blood loss, maternal morbidity
101 and mortality.

102 Sample size estimation was done by using a large effect size ($d = 0.95$),
103 $\alpha = 0.2$, and a power of 80%, yielding a total sample size of 14, with
104 at least 7 cases in each group. The study included antenatal patients aged
105 18-45 years diagnosed with placenta previa and PAS either prenatally
106 through imaging (USG, MRI) or intra-operatively. Detailed intra-
107 operative parameters, including duration of surgery, blood loss
108 (measured using the WHO Visual Method), and peri- and postoperative
109 complications, were recorded. Postoperative complications were noted,
110 and patients were followed for 6 months. The WHO Visual Method was

111 used to estimate blood loss by assessing blood volumes in sponges and
112 suction containers and recording external blood losses ^(9,10).

113 Data was organised into tables and analysed using various statistical
114 tests (t-test, z-score, r-score) to determine the significance of differences
115 between SCOH and TOH outcomes, with p-values calculated for
116 statistical relevance.

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118 **Definitions and Terminology:**

119 ➤ *Placenta Previa: Refers to the placenta lying in lower segment of uterus*

120 ➤ **Types of Placenta Previa:**

121 • *Low-Lying Placenta: The leading edge of the placenta is within 20mm of the*
122 *os but not covering it.*

123 • *Placenta Previa: The placenta covers the os.*

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125 ➤ **Placenta Accreta Spectrum (PAS):** *Refers to abnormal placental*
126 *adherence and invasion into the uterine wall, including:*

127 • *Placenta Accreta: Abnormal adherence without myometrial invasion.*

128 • *Placenta Increta: Invasion into the myometrium.*

129 • *Placenta Percreta: Invasion beyond the myometrium into the serosa.*

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133 **Types of Obstetric Hysterectomy:**

134 1. *Subtotal Obstetric Hysterectomy*: The cervix and lower uterine segment are
135 *preserved.*

136 2. *Supracervical Obstetric Hysterectomy (SCOH)*: The cervix is partially or
137 *completely left in place.*

138 3. *Total Obstetric Hysterectomy (TOH)*: The entire uterus, including the portio
139 *vaginalis of cervix, is removed.*

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141 **Inclusion Criteria:**

142 - Patients diagnosed with placenta previa and PAS prenatally /intra-
143 operatively.

144 **Exclusion Criteria:**

145 - Patients with pre-existing coagulation disorders.

146 - Obstetric hysterectomies performed for reasons other than PAS, such
147 as atonic postpartum hemorrhage or uterine rupture

148 - Obstetric hysterectomies performed more than 42 days postpartum.

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152 **Result:** The study observed a total of 18,555 deliveries from November
153 2021 to December 2023. Among these, 136 cases were diagnosed with
154 placenta previa, leading to an incidence of 0.7%. Out of the 19 cases of
155 obstetric hysterectomies performed for placenta previa with PAS, 7
156 cases underwent Total Obstetric Hysterectomy (TOH) and 12 cases
157 underwent Supracervical Obstetric Hysterectomy (SCOH). A significant
158 number of these patients, 66.7%, belonged to urban areas. Notably,
159 85.7% of TOH cases and 41.6% of SCOH cases were unbooked, and the
160 majority (100% TOH and 75% SCOH) were referred from other centres.
161 The mean age of patients in the TOH group was 22.75 ± 3.3 years, while
162 in the SCOH group, it was slightly higher at 28.08 ± 3.06 years. Most of
163 the cases in the TOH group were term pregnancies (57.1%), while the
164 majority of cases in the SCOH group were pre-term (75%). The mean
165 gestational age in the TOH group was 38.0 ± 2.45 weeks, compared to
166 32.67 ± 4.54 weeks in the SCOH group. Most patients in both groups
167 presented with complaints of vaginal bleeding, and gravida 3 status was
168 most common (57.1% in TOH and 50% in SCOH). At admission, 28.6%
169 of TOH cases and 50% of SCOH cases were critical. Consciousness
170 levels improved post-operatively in the SCOH group, while tachycardia
171 and hypotension worsened in both groups after surgery. Before surgery,
172 PAS diagnosis was inconsistent, with ultrasound scans available for
173 85.7% of TOH cases and 66.7% of SCOH cases.

174 Placenta previa was preoperatively identified in 66.6% of TOH cases
 175 and 75% of SCOH cases, though PAS identification was much lower
 176 (33% in TOH and 12.5% in SCOH). Intraoperative findings confirmed
 177 placenta previa in 100% of cases in both groups. The mean blood loss
 178 was observed to be slightly higher in the TOH group (1257 ± 408.6 mL)
 179 compared to the SCOH group (1100 ± 292.9 mL), ($p = 0.3$). Also, the
 180 operating duration was longer in TOH cases (157 minutes) than in
 181 SCOH cases (136 minutes), ($p = 0.4$).

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183 Table 1: Distribution of cases according to intraoperative blood loss

Blood Loss	Total Obstetric Hysterectomy (TOH) n=7		Supracervical Obstetric Hysterectomy (SCOH) n=10		P value
	Frequency	Percent	Frequency	Percent	
600-1000ml	5	71.4	4	40.0	0.3
1001-1500ml	1	14.3	5	50.0	
>1500ml	1	14.3	1	10.0	
Mean +/- SD	1257+/-408.6		1100+/- 292.9		

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- 185 • Mean blood loss was higher in TOH Group in comparison to SCOH group.
- 186 • **2 cases of SCOH had their caesarean done at outside hospital and*
 187 *intraoperative PAS was found for which they were referred to our center for*
 188 *further management. Hence, accurate blood loss estimation could not be*
 189 *calculated in them and therefore not included in table.*

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193 Table 2: Distribution of cases according to duration of surgery

Time in minutes	Total Obstetric Hysterectomy (TOH) n=7		Supracervical Obstetric Hysterectomy (SCOH) n=10		P value
	Frequency	Percent	Frequency	Percent	
80-99min	1	14.3	2	20.0	0.4
100-119min	0	0.0	3	30.0	
120-139min	1	14.3	1	10.0	
140-159min	3	42.9	2	20.0	
160-179min	0	0.0	0	0.0	
180-199min	1	14.3	0	0.0	
200-219min	0	0.0	0	0.0	
220-239min	0	0.0	2	20.0	
240-259min	1	14.3	0	0.0	
Mean +/- SD	157+/-44.3		139+/-48.2	0.1	

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- The Operating duration of TOH was observed to be more than SCOH group.

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- *2 cases of SCOH had their caesarean done at outside hospital and intraoperative PAS was found for which they were referred to our center for further management. Hence their duration of surgery was not included in the table.

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201 In cases where internal iliac artery ligation was performed, blood loss

202 was significantly higher, with a mean blood loss of 1400 ± 406 mL

203 compared to 1005 ± 162 mL when no ligation was done ($p = 0.01$).

204 No significant difference was observed in the requirement for inotropic

205 support post-operatively between TOH (42.9%) and SCOH (58.3%)

206 groups. However, cases with internal iliac artery ligation were more

207 likely to require inotropic support (85.7%) compared to those without

208 ligation (33.3%)—this difference was statistically significant ($p = 0.02$).

209 Mortality was noted in two cases from the SCOH group where internal
 210 iliac artery ligation was performed, with no deaths in the TOH group.

211

212 Table 3: Distribution of cases according to blood loss with internal iliac
 213 ligation

Blood loss	Without internal iliac ligation	With internal iliac ligation	P value
600-999ml	4	1	0.01
1000-1499ml	6	2	
1500-1999ml	0	3	
>2000ml	0	1	
Mean SD	1005+/-162	1400+/-406	

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- 215 • Significantly higher blood loss was observed in cases where Obstetric Hysterectomy
 216 done after Internal Iliac artery ligation.
- 217 • *2 cases of SCOH had their caesarean done at outside hospital and intraoperative PAS
 218 was found for which they were referred to our center for further management. Hence,
 219 accurate blood loss estimation could not be calculated in them and not included in table.
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222 Table 4: Distribution of cases according to duration of surgery with
 223 internal iliac ligation

Duration of Surgery	Without internal iliac ligation	With internal iliac ligation	P value
<60mins	0	0	
60-90mins	2	0	
91-120mins	2	2	
121-150mins	5	1	
151-180mins	1	0	

181-210mins	0	1	
>210mins	0	3	
Mean SD	126+/-26.4	174+/-64.5	0.04

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225 • *2 cases of SCOH had their caesarean done at outside hospital and intraoperative PAS
 226 was found for which they were referred to our center for further management. Hence
 227 their duration of surgery was not included in the table.

228 • Mortality occurred in two cases who had Internal Iliac ligations followed by SCOH.

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230 Postoperative complications included anemia which was common in
 231 both the groups (85% in TOH, 90% in SCOH). ARDS was more
 232 common in the TOH group (42.9%). Long term complication like
 233 dyspareunia was found in 42.8% of TOH cases Vs 11.1% of SCOH
 234 cases. Vaginal lubrication was comparable between the groups (71.4%
 235 TOH, 77.4% SCOH), and there was no significant difference in the
 236 frequency of sexual activity between the groups. There were 2 cases of
 237 intrauterine death in each group.

238

239 **Discussion:** Placenta previa with Placenta Accreta Spectrum (PAS)
 240 poses one of the most significant challenges in modern obstetric
 241 practice. Its rising incidence, driven by an increase in caesarean sections
 242 and uterine surgeries, correlates directly with higher rates of obstetric
 243 hysterectomy (OH), a life-saving procedure in severe maternal
 244 hemorrhage situations. The incidence of OH in developed countries is

245 around 1/1000 deliveries, while in developing countries like India, the
246 rate is higher, ranging from 1 to 5 per 1000 deliveries. In the current
247 study, the incidence of OH was 0.17%. Historical studies such as
248 Gautam Allahabadia et al. (1990), suggests septic abortion was the most
249 common cause of OH, the advent of modern antibiotics and improved
250 maternal care practices has shifted the leading cause to PAS.

251 In this study, we observed trends and outcomes of obstetric
252 hysterectomies in cases of placenta previa, specifically with PAS, over a
253 two-year period, focusing on maternal and fetal outcomes.

254 In comparison with global and regional studies, the common indications
255 for OH vary. Postpartum hemorrhage (PPH) remains the most frequent
256 cause of OH globally, with uterine atony and ruptured uterus being key
257 contributors. However, this study aligns with findings from studies like
258 D.W. Sturdee et al. (1986), R.K. Praneshwari et al. (2004), and Vijay Y
259 Kalyankar et al. (2019), where placenta accreta spectrum disorders were
260 the primary cause of OH ⁽¹²⁻¹⁶⁾.

261 Impact of Referral and Patient Population: The high percentage (84.2%)
262 of referred cases in this study indicates the significance of inter-hospital
263 transfer in managing complex obstetric cases. Unbooked cases
264 constituted 56.8%, highlighting the critical need for improved antenatal
265 care and early detection of high-risk pregnancies specially PP and PAS
266 in cases of previous cesarean section. In current study, two cases were

267 operated outside this tertiary hospital and were not diagnosed as placenta
268 previa or PAS and taken for LSCS at those centers and then referred due
269 to PPH after LSCS. Finally, they landed in hysterectomy in our institute
270 and in spite of OH, one pt died in post operative period. Such incidence
271 reinforces the serious need of training for obstetric hysterectomy to all
272 obstetricians.

273 The choice between TOH and SCOH can depend on the position and
274 extent of placental invasion and the operating surgeon's choice. In this
275 study, TOH was performed in 7 cases, while SCOH was performed in 12
276 cases. Although TOH offers complete removal of uterine tissue, thus
277 reducing recurrence risk, it was associated with longer surgery duration
278 and higher blood loss. SCOH, by preserving the cervix, resulted in
279 shorter operative times and slightly lower intra-operative blood loss,
280 consistent with other studies, such as those by Jayshree Mulik et al.
281 (2019) and Ambika HE et al. (2017) ^(17,18).

282 In contrast to the purpose of ligating the internal iliac arteries to reduce
283 blood flow to the uterus and potentially minimizing blood loss during
284 surgery, the findings of the current study suggests that OH after IIAL
285 was associated with higher amount of blood loss and increased
286 intraoperative time. Conservative management of PAS can be
287 considered in some special cases with the aim to spare fertility ⁽¹⁹⁻²²⁾.
288 However, Internal Iliac Artery ligation before OH in cases of PAS is not

289 universally mandatory, but can be valuable option in specific cases. But
290 if bleeding cannot be controlled, emergency OH is unavoidable.

291 Blood and blood products arrangements is essential in managing critical
292 cases of PP and PAS to combat with severe anemia. As in current study,
293 an average of 3 units of packed red cells (PRC) and additional blood
294 components (FFP and platelets) were required intra-operatively.

295 Hemodynamic instability necessitates postoperative inotropic support in
296 many cases of OH. Maternal morbidity remains high in this cohort, as
297 reflected in postoperative complications. A good HDU/ICU facility
298 should be considered as integral component for all obstetric care unit to
299 improve maternal outcome and reduce mortality. No significant
300 difference was observed in neonatal outcomes between two groups.



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Figure: Case of Placenta Percreta

Classical Caesarean Section done followed by Supracervical Obstetric Hysterectomy

Source: Department of Obstetrics & Gynaecology, Pt.JNM Medical College, Raipur

304

305 **Conclusion:** The study highlights the high incidence of PAS in obstetric
306 hysterectomy. TOH and SCOH each have distinct advantages and risks
307 that must be weighed against patient-specific factors. Direct proceeding
308 to hysterectomy rather than after internal iliac artery ligation appear to
309 be associated with better maternal outcome. Regarding type of Obstetric
310 hysterectomy, further research with larger sample size is warranted to
311 refine management strategies for placenta previa with PAS.

312 **Limitations of the study:**

- 313 • The main limitation of our study was its small sample size.
- 314 • Different stepwise devascularisation pattern before obstetric
315 hysterectomy was a confounding factor in this observational study.
- 316 • Duration of Surgery should have been more accurate if the time
317 taken to release the adhesions would have been noted.

318

319 **Acknowledgement:** It is a testament to the collective support and
320 encouragement of my teachers, Department of Obstetrics &
321 Gynaecology, Pt. JNM Medical College, Raipur and my brother.

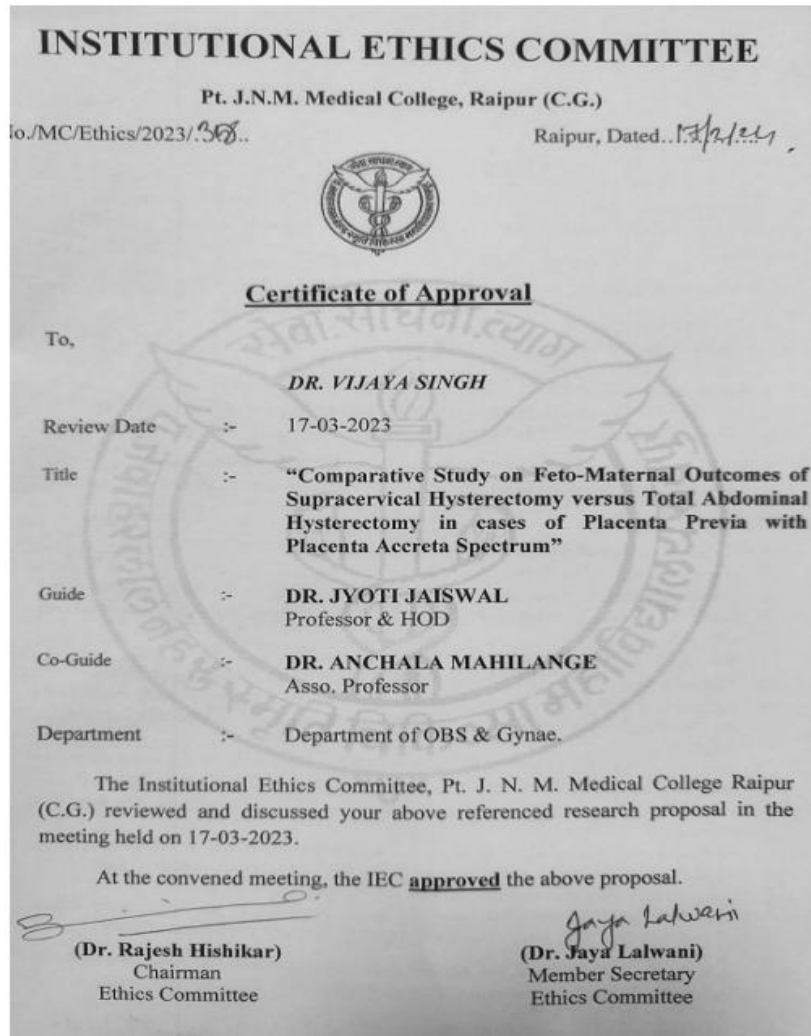
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323 **Conflict of interest:** None

324 **Source of funding:** None

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326 **Ethical Approval Certificate:**



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330 **References:**

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