Placenta Previa/Accreta and Prior Cesarean Section

STEVEN L. CLARK, MD, PAUL P. KOONINGS, MD, AND JEFFREY P. PHELAN, MD

To assess the relationship between increasing numbers of previous cesarean sections and the subsequent development of placenta previa and placenta accreta, the records of all patients presenting to labor and delivery with the diagnosis of placenta previa between 1977 and 1983 were examined. Of a total of 97,799 patients, 292 (0.3%) had a placenta previa. The risk of placenta previa was 0.26% with an unscarred uterus and increased almost linearly with the number of prior cesarean sections to 10% in patients with four or more. The effect of advancing age and parity on the incidence of placenta previa was much less dramatic. Patients presenting with a placenta previa and an unscarred uterus had a 5% risk of clinical placenta accreta. With a placenta previa and one previous cesarean section, the risk of placenta accreta was 24%; this risk continued to increase to 67% (two of three) with a placenta previa and four or more cesarean sections. Possible mechanisms and clinical implications are discussed. ***(Obstet Gynecol 66:89, 1985)***

The pregnant patient presenting with a prior low transverse uterine incision and a placenta previa is known to be at increased risk for concurrent placenta accreta.[1] The magnitude of this risk, however, is not well documented. Further, it has been suggested that a uterine scar, per se, predisposes a patient to the development of placenta previa in subsequent pregnancies.[2] This association is also poorly defined. This study was undertaken in an effort to assess more clearly the risk of placenta previa in patients with prior cesarean sections and to assess the risk of placenta accreta in patients with both a scarred uterus and a placenta previa.

Materials and Methods

The records of those patients presenting to the Los Angeles County/University of Southern California Women's Hospital labor and delivery unit between January 1977 and December 1983 with the diagnosis of placenta previa were reviewed. Low-lying placentas or marginal placenta previas in which vaginal delivery was accomplished were not included. Details of obstetric history, the occurrence of clinical placenta accreta, and the clinical management of placenta accreta were noted. General maternal age and parity distribution for the entire population under consideration was approximated by extrapolation from a randomly selected subpopulation; all patients delivering in a randomly chosen one-week period from each of the years under consideration made up this subpopulation. These weekly subgroups varied in size from 234 to 306 patients for a total of 1841 patients.

Results

Between January 1, 1977 and December 31, 1983, 97,799 patients delivered at Los Angeles County/USC Women's Hospital. Ninety-two thousand nine hundred seventeen women presented to the labor and delivery unit with an unscarred uterus, while 4882 (5%) had had one or more cesarean sections. In the overall population, the diagnosis of placenta previa was made in 292 patients (0.3%). The mean age of these patients was 27 years, and the mean parity was three. In six patients (2%) with placenta previa, the presence or absence of previous uterine incisions could not be determined definitely from available records. These patients were excluded from the analysis.

Tables 1 and 2 detail the effect of advancing maternal age and parity on the incidence of placenta previa. Table 3 demonstrates the relationship between number of prior uterine incisions and the subsequent occurrence of placenta previa. An 11-fold increase in the incidence of placenta previa is observed in patients over the age of 40 when compared with those less than 20 years of age. A sevenfold increase was found in patients with parity of five or greater when compared

From the Department of Obstetrics and Gynecology, University of Southern California School of Medicine, and Women's Hospital, Los Angeles County/USC Medical Center, Los Angeles, California.

Presented at The American College of Obstetricians and Gynecologists District VII and IX Annual Meeting, Scottsdale, Arizona, October 28–31, 1984.

0029-7844/85/$3.30

Table 1. Relationship of Placenta Previa to Maternal Age

Maternal age	Patients (N = 97,799)	Placenta previa (N = 286)	%
20	20,538	19	0.09
20–24	34,914	67	0.19
25–29	23,863	79	0.33
30–34	11,540	50	0.43
35–39	5086	42	0.83
40	1858	20	1.1
Unknown		9	

Table 3. Relationship of Placenta Previa to Number of Prior Uterine Incisions

Cesarean sections (No.)	Patients (N = 97,799)	Placenta previa (N = 286)	%
0	92,917	238	0.26
1	3820	25	0.65
2	850	15	1.8
3	183	5	3.0
4, 5, or 6	29	3	10.0

with nulliparous patients. The risk of subsequent placenta previa increased dramatically with an increasing number of prior uterine incisions, ranging from 0.26% with an unscarred uterus to 10% with four or more prior uterine incisions, a 38-fold increase.

During this same study period, 48 patients presented with the combined diagnoses of placenta previa and one or more previous cesarean sections. The risk of placenta accreta ranged from 5% in patients with placenta previa and an unscarred uterus to 67% in patients with four prior cesarean sections and a placenta previa (Table 4). Overall, 35% of patients presenting with the combined diagnosis of placenta previa and one or more prior cesarean sections had a placenta accreta noted at the time of cesarean section.

In the presence of a prior uterine incision, 14 of 17 patients (82%) with placenta previa/accreta underwent hysterectomy, compared with seven of 12 patients (58%) necessitating hysterectomy in placenta previa/accreta with an unscarred uterus. This difference was not significant. Overall, 72% of patients with placenta previa/accreta underwent hysterectomy. There were no maternal deaths in the series.

Discussion

The incidence of placenta previa ranges from one in 214 (0.5%) to one in 327 (0.3%),[3–7] probably reflecting differences in definition of this condition. The association of advancing age and parity with the development of placenta previa is well known, although the relative importance of these two factors is disputed. Eastman and Hellman[8] found age to be a more important factor, whereas Nelson and Huston[5] and Pedowitz[3] found increasing parity to have a more significant effect on the development of placenta previa. The current findings support the former view.

Risk figures for age and parity, presented in Tables 1 and 2 are in general agreement with other reports.

Bender[2] first suggested the relationship between previous cesarean section scars and the subsequent development of placenta previa. Singh et al[9] reported a 3.9% incidence of placenta previa among patients with previous cesarean section, a figure somewhat higher than the 1% incidence found in the current studied population. The exclusion of cases in which the degree of previa was insufficient to preclude vaginal delivery may account, in part, for this discrepancy. Additionally, a direct relationship between the number of prior uterine incisions and the incidence of placenta previa (Table 3) was found.

It has been suggested that the presence of a uterine scar in the lower segment somehow "attracts" a low implantation of the placenta.[10] Given the known frequency of ultrasonically diagnosed placenta previas in early gestation (roughly 5% in the second trimester),[11,12] the authors believe a more likely explanation involves failure of differential growth of a scarred

Table 2. Relationship of Placenta Previa to Maternal Parity

Parity	Patients (N = 97,799)	Placenta previa (N = 286)	%
0	35,403	48	0.14
1	25,134	59	0.23
2	15,061	52	0.35
3	10,660	46	0.43
4	4597	25	0.54
5	6944	48	0.69
Unknown		8	

Table 4. Placenta Previa With Prior Uterine Incision(s)—Effect on Incidence of Placenta Accreta

Prior cesarean sections (No.)	Patients with placenta previa (N = 286)	Placenta previa/accreta (N = 29)	%
0	238	12	5
1	25	6	24
2	15	7	47
3	5	2	40
4	3	2	67

lower uterine segment. According to this model, fewer of the originally low implanted placentas would "migrate" through differential growth, away from the lower uterine segment/cervical area, resulting in a higher incidence of clinical placenta previa at term. It seems reasonable to assume that with an increasing amount of scar tissue in the lower segment, such differential growth would be impaired to a greater extent, leading to an increasingly high incidence of placenta previa.

The incidence of placenta previa among all patients with placenta accreta varies from 34 to 64%.[13,14] The authors observed a 60% incidence of prior cesarean section in patients with placenta previa/accreta, a figure similar to the 43% reported by Read et al[13] and the 56% reported by Kistner et al.[1] A review of the literature reveals only a single report defining the specific risk of placenta accreta in patients with both a prior cesarean section and placenta previa. Singh et al[9] found that three of 20 patients (15%) with this combined diagnosis had a placenta accreta. In this larger series, the overall risk was found to be 35%. This risk rose according to the number of prior uterine incisions from 12 of 238 (5%) with an unscarred uterus to two of three (67%) in patients with four previous cesarean sections and a placenta previa. Overall, 24% of patients with one cesarean section and a placenta previa and 48% of patients with two or more cesarean sections and a placenta previa had a placenta accreta at the time of cesarean section (Figure 1). Decidual tissue is scant in the lower uterine segment, and decidualization may be impaired further in the presence of one or more lower segment scars. This may lead to an increased likelihood of trophoblastic invasion into the myometrium should the placenta implant in this area.

The clinical severity of placenta accreta may be increased if associated with a uterine scar. Forty-two percent of previa/accretas not associated with a lower segment scar were amenable to conservative (nonhysterectomy) management, compared with 18% when seen in conjunction with a uterine scar, although the numbers were not large enough for this difference to reach statistical significance. The authors' overall incidence of hysterectomy for placenta accreta (72%) is consistent with the incidence of 64% reported by Read et al.[13]

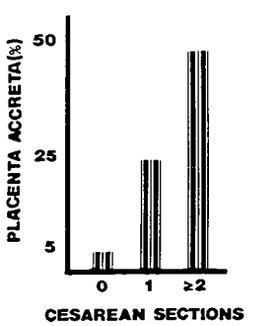

Figure 1. Relationship of number of prior cesarean sections to the development of placenta accreta in patients with placenta previa.

McHattie[15] reported an overall 42% maternal mortality rate among patients with placenta previa/accreta who did not undergo hysterectomy. On this basis, he concluded that total hysterectomy is the treatment of choice for placenta previa/accreta. In contrast, the authors observed no maternal deaths among the 28% of patients with this condition who were treated conservatively. Thus, while prompt hysterectomy may be indicated in most patients, it is believed that treatment of placenta previa/accreta may be individualized and, at times, include attempts at conservative management. Such management may include curettage, local excision and repair, or oversewing of the implantation site.

A review of the literature suggests an apparent steady rise in the incidence of placenta accreta. Kistner et al,[1] in 1952, reported the incidence of placenta accreta among patients with placenta previa to be two per 1000. Read et al[13] found an incidence of 40.5 per 1000 between 1975 and 1979 compared with 101 per 1000 in the current population. Given the demonstrated association between placenta accreta and prior cesarean section, one may postulate that the marked rise in cesarean section rate seen in the past decade may be contributing to this increased incidence of placenta accreta.

All obstetricians should be aware of the strong association between placenta previa in a scarred uterus and placenta accreta. The fact that the risk of this life-threatening condition continues to rise with multiple prior uterine incisions gives further support to attempted vaginal delivery after a cesarean section.

References

1. Kistner RW, Hertig AT, Reid DE: Simultaneously occurring placenta previa and placenta accreta. Surg Gynecol Obstet 94:141, 1952
2. Bender S: Placenta previa and previous lower segment cesarean section. Surg Gynecol Obstet 98:625, 1954
3. Pedowitz P: Placenta previa. Am J Obstet Gynecol 93:16, 1965
4. Hibbard L: Placenta previa. Am J Obstet Gynecol 104:172, 1969
5. Nelson HB, Huston JE: Placenta previa, a possible solution to the associated high fetal mortality rate. J Reprod Med 7:188, 1971
6. Crenshaw C, Jones DED, Parker RT: Placenta previa: A survey of twenty years experience with improved perinatal survival by expectant therapy and cesarean delivery. Obstet Gynecol Surv 28:461, 1973
7. Cotton DB, Read JA, Paul RH, et al: The conservative aggressive management of placenta previa. Am J Obstet Gynecol 137:687, 1980

8. Eastman JN, Hellman LM: William's Obstetrics, 13th edition. New York, Appleton-Century-Crofts, 1964, p 625
9. Singh PM, Rodrigues C, Gupta AN: Placenta previa and previous cesarean section. Acta Obstet Gynaecol Scand 60:367, 1981
10. Taylor ES: Editorial comments. Obstet Gynecol Surv 38:96, 1983
11. Rizos N, Davan TA, Miskin M, et al: National history of placenta previa ascertained by diagnostic ultrasound. Am J Obstet Gynecol 133:287, 1979
12. Wexler P, Gottesfeld KR: Early diagnosis of placenta previa. Obstet Gynecol 54:231, 1979
13. Read JA, Cotton DB, Miller FC: Placenta accreta: Changing clinical aspects and outcome. Obstet Gynecol 56:31, 1980
14. Fox H: Placenta accreta 1945–1969. Obstet Gynecol Surv 27:475, 1972
15. McHattie TJ: Placenta previa accreta. Obstet Gynecol 40:795, 1972

Address reprint requests to:
Steven L. Clark, MD
Women's Hospital
Room 5K40
1240 North Mission Road
Los Angeles, CA 90033

Submitted for publication August 30, 1984.
Revised November 26, 1984.
Accepted for publication December 6, 1984.