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ABSTRACT

Objective: To evaluate benefits of use of ureteral stents in association with cesarean hysterectomy in case of placenta accreta.

Methods: This was a single center, cohort study. Clinical records of singleton pregnancies with placenta accreta who underwent cesarean hysterectomy were included in the study. For this study, pregnancies with diagnoses of placenta accreta, increta, or percreta were considered under the umbrella term of placenta accreta. For all women with placenta accreta, delivery was planned via cesarean hysterectomy at 34⁰–35⁶ weeks, without any attempt to remove the placenta. Reasons for earlier delivery included vaginal bleeding and spontaneous onset of labor. The primary outcome was the incidence of unintentional urinary tract injury. Outcomes were compared in a cohort of women who had planned the placement of ureteral stents and in those who did not.

Results: Forty-four singleton gestations with confirmed placenta accreta at the time of cesarean hysterectomy were included in the study. Twenty-four (54.5%) of the included women had the placing of ureteral stents prior to cesarean, while 20 (45.5%) did not. At histological confirmation, most of them had placenta accreta (17/44, 38.6%), 14 placenta increta (31.8%), and 13 placenta percreta (29.6%). Urinary tract injuries occurred in eight cases (18.2%), six in the ureteral stents and two in the non-ureteral stents group (25 versus 10%; $p = .21$). All the injuries were bladder injuries, while no cases of ureteral injury were recorded. All injuries were recognized intraoperatively.

Conclusion: In case of placenta accreta, the use of ureteral stents in association with cesarean hysterectomy does not reduce the risk of urinary tract injury.

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Accreta; cesarean delivery; placenta; postpartum hemorrhage; previa

Introduction

Placenta accreta is a complication of pregnancy characterized by an abnormal adherence of the placenta to the uterine wall, secondary to a defect in the decidua basalis [1]. The reported incidence of abnormal placentation is highly variable, ranging from 1:93,000 to 1:111 pregnancies [2]. The incidence of abnormal placentation is increasing, most likely related to the increasing rate of cesarean delivery, one of the most important risk factors for placenta accreta [3].

Currently, the management options for placenta accreta include both conservative and hysterectomy approaches [4–18]. Conservative strategy consists in leaving the placenta *in situ* during cesarean delivery

without hysterectomy. The cesarean hysterectomy approach consists in leaving the placenta *in situ* during the operation and proceeding with hysterectomy immediately after cesarean delivery [5–10].

Cesarean hysterectomy is the preferred management option, but in addition to the risk of severe hemorrhage is associated with the risk of unintentional urinary tract injury [13]. Therefore, different techniques, including the use of ureteral stents, have been described in order to reduce urinary tract injury during the management of placenta accreta [4].

The aim of our study was to evaluate the benefits of the use of ureteral stents in association with cesarean hysterectomy in case of placenta accreta.

Materials and methods

Study design

This was a single center, retrospective, cohort study. Clinical records of singleton pregnancies at risk of placenta accreta because of persistent placenta previa in the setting of prior cesarean delivery who delivered by planned cesarean hysterectomy at the University of Naples “Federico II” (Naples, Italy) from January 2010 to December 2018 were collected in a dedicated database. For this study, pregnancies with the diagnoses of accreta, increta, or percreta were considered under the umbrella term of placenta accreta. Only cases with confirmed placenta accreta at the time of delivery were included in the study.

In our institution, all women with placenta previa identified in the second trimester had a follow-up ultrasound at 32–34 weeks. Only those with prior cesarean delivery in whom the placenta reached the level of the internal cervical os at the last ultrasound examination in the third trimester were considered as women with persistent placenta previa in the setting of prior cesarean delivery and therefore at risk of placenta accreta [17,18]. Only singleton gestations with suspected placenta accreta were included in this study. Women were included only in case of intraoperative confirmation of placenta accreta and formal histologic confirmation.

For all women with suspected placenta accreta delivery was planned via cesarean hysterectomy at 34°–35° weeks, without any attempt to remove the placenta [13]. Reasons for earlier delivery included vaginal bleeding and spontaneous onset of labor.

Statistical analysis

Statistical analysis was performed using statistical package for social sciences (SPSS) v. 19.0 (IBM Inc., Armonk, NY).

Data are shown as means \pm standard deviation (SD), or as medians (range), or as number (percentage). Univariate comparisons of dichotomous data were performed with the use of the Chi-square or Fisher exact test. Comparisons between groups were performed with the use of the Man–Whitney *U* test, to test group medians with range; and with the use of the *T*-test or the one-way ANOVA to test group means with SD. Primary and secondary outcomes were estimated with multivariate analyses.

We calculated two-sided *p*-values. A *p*-value $<.05$ was considered to indicate statistical significance.

The primary outcome was the incidence of unintentional urinary tract injury. Outcomes were compared in a cohort of women who had planned the placement of ureteral stents and in those who did not. This study was reported following the STROBE guidelines [19].

Results

Forty-four singleton gestations, met the inclusion criteria and were included in the study.

Twenty-four (54.5%) of the included women had the placing of ureteral stents prior to cesarean, while 20 (45.5%) did not. At histological confirmation, most of them had placenta accreta (17/44, 38.6%), 14 placenta increta (31.8%), and 13 placenta percreta (29.6%). The mean maternal age was about 34 years, and the mean BMI 27. All women had prior cesarean delivery, ranged from 1 to 6, with the vast majority, having two prior cesarean delivery, 16 (16.7%) in the ureteral stents group, and 12 (60.0%) in the non-ureteral stents group (Table 1).

Urinary tract injuries occurred in eight cases (18.2%), six in the ureteral stents and two in the non-ureteral stents group (25 versus 10%; *p* = .21). All the injuries were bladder injuries, while no cases of ureteral injury were recorded. All injuries were recognized intraoperatively (Table 2).

Discussion

Main findings

In this small, single center, underpowered, retrospective study, use of ureteral stents in association with cesarean hysterectomy in women with placenta accreta did not reduce the risk of urinary tract injury. The possibility of intraoperative recognition of the urinary tract injury was also not increased.

The most important limitation of our study is that this is a retrospective, non-randomized comparison. We acknowledge that some outcomes, including the primary outcome, were underpowered; however, they are fortunately uncommon with a low overall rate. Since the decision to plan for ureteral stents was at attending discretion, the outcomes could be influenced due to selection bias. Notably, the placement of ureteral stents may be beneficial in some conditions but not in others. For example, placenta accreta with parametrial invasion has a different risk of ureteral injury compared with placenta accreta with bladder invasion.

Table 1. Characteristics of the included women.

	Ureteral stents, N = 24	No ureteral stents, N = 20	p Value
Age	34.1 ± 4.1	34.5 ± 4.9	.82
BMI	26.8 ± 7.0	27.1 ± 8.1	.88
Ethnicity, n (%)			.56
White 98%	23 (95.8%)	20 (100%)	
Others 2%	1 (4.2%)	0	
Prior cesarean deliveries, n (%)			.20
1	4 (16.7%)	7 (35.0%)	
2	16 (66.6%)	12 (60.0%)	
3	3 (12.5%)	0	
4	0	0	
5	0	1 (5.0%)	
6	1 (4.2%)	0	
Histological findings, n (%)			.31
Placenta accreta	8 (33.3%)	9 (45.0%)	
Placenta increta	10 (41.7%)	4 (20.0%)	
Placenta percreta	6 (25.0%)	7 (35.0%)	

Data are presented as number (percentage), or as mean ± standard deviation. Boldface data, statistically significant. BMI: body mass index; SD: standard deviation.

Table 2. Primary and secondary outcomes.

	Ureteral stents, N = 24	No ureteral stents, N = 20	p Value
Overall urinary tract injury, n (%)	6 (25.0%)	2 (10.0%)	.21
Bladder injury, n (%)	6 (25.0%)	2 (10.0%)	.21
Ureteral injury, n (%)	0	0	Not applicable
Combined bladder and ureteral injury, n (%)	0	0	Not applicable
Genitourinary fistula, n (%)	0	0	Not applicable
Intraoperative recognition of the urinary tract injury, n (%)	6 (25.0%)	2 (10.0%)	.21
Postoperative recognition of the urinary tract injury, n (%)	0	0	Not applicable
Blood transfusion (units)			
RBC	4.0 ± 3.8	2.6 ± 2.1	.12
FFP	3.7 ± 4.4	1.5 ± 1.9	.05
Severe maternal morbidity			.42
ICU admission	0	0	
Death	0	1 (5.0%)	
GA at delivery (weeks)	34.7 ± 2.2	35.4 ± 2.7	.34

Data are presented as number (percentage), or as mean ± standard deviation. GA: gestational age; RBC: red blood cells; FFP: fresh frozen plasma.

Implication

Placenta accreta is a major contributor to maternal morbidity and mortality in many countries, including the USA. The optimal management regimen has yet to be defined because of the paucity of outcome data in the literature and the lack of randomized controlled trials. So far, no large studies aimed to evaluate the benefits of ureteral stents, have been published.

Scheduled preterm cesarean hysterectomy appears to be the treatment of choice for women with suspected placenta accrete, as widely demonstrated in the literature [2,6,20–22]. The 30% urinary tract injury rate at the time of cesarean hysterectomy for placenta accreta is significantly higher than the 4.8% rate reported for hysterectomy performed for gynecological diseases [20].

However, the placement of ureteral stent placement is not always necessary [6,14,15,21–22] and is not currently recommended by guidelines [14,15]. However, according to Matsubara et al. [21] knowing the ureter position during the surgery may give the

surgeon peace of mind, and usually required a few minutes for an experienced urologist. In our cohort, ureter stents were placed in the operative theater just before surgery. Placement the day before is not recommended because it may cause uterine contractions requiring emergency surgery [21].

In a recent systematic review, Tam Tam et al. found that preoperative placement of bilateral ureteral stents significantly reduced the risk of urinary tract injury from 18 to 6% [4]. In addition, cystoscopic placement of the stents has demonstrated to be quickly and easily accomplished even in an emergency and associated with relatively minimal risk.

Conclusions

In summary, in the case of placenta accreta, the use of ureteral stents in association with planned cesarean hysterectomy does not improve maternal outcome. A future large multicenter randomized controlled trial is necessary to confirm findings from this single center retrospective study.

Disclosure statement

No potential conflict of interest was reported by the authors.

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