MJMR, Vol. 35, No. 4, 2024, pages (128-137).

Open Access
ISSN:2682-4558

Research Article

Lateral versus central approach in dissecting urinary bladder during cesarean section in placenta accreta spectrum: (Case Control Study)

Heba Hassan Ahmed[1], Mina Badr Abdallah[2], Saad El Gelany[1], and Moustafa Kamal Abdalhasseb[1]

[1] Department of Obstetrics And Gynecology, Faculty of Medicine – Minia University, Egypt.
[2] Resident of Obstetrics and Gynecology, Assiut obstetrics, Gynecology and Children Hospital, Assiut, Egypt.

DOI: 10.21608/MJMR.2024.259907.1636

Abstract

Background: Injury of the urinary bladder is a prevalent complication associated with cesarean sections. Multiple cesarean sections, placenta previa (PP), and any form of Placenta accreta spectrum (PAS) disorders are recognized as a significant risk factors for urinary tract injuries after cesarean birth. Aim: To compare the urological outcomes of lateral and classical central urinary bladder dissection, in placenta previa and PAS cases. **Methods:** A case-controlled study included patients suspected to be PAS disorders based upon ultrasound findings (2D and color Doppler ultrasound) was conducted. All recruited patients were subjected to caesarian delivery with 2 modalities of bladder dissection; central and lateral approaches. **Results:** A total of 111 pregnant women suspected with PAS disorders were recruited; 85 females had central and 26 had lateral bladder dissection. Eighty-seven of our patients were placenta previa and 24 were PAS cases; 71-cases with PP were subjected to central bladder dissection and 16 had lateral approach while the placenta accretes cases; 14 had central approach and 10 had the lateral approach of bladder dissection. The urinary system injuries among the PP group was 17% among central group in comparison to 0% among the lateral group with a significant difference between them (P=0.021*). While the urinary system injuries among the placenta accrete group was 21.4% among the central group and 20% among the lateral approach group with no significance between them. **Conclusion:** Lateral approach of bladder dissection may reduce the incidence of urinary system injuries among PP cases and of lower significance among PAS.

Key words: Placenta accrete spectrum, urinary bladder dissection, lateral approach.

Introduction and aim of the work:

Placenta Previa means the presence of placental tissue at abnormal site that extends over the internal cervical or during pregnancy.(1) The incidence of placenta previa accounts for 2% at 20 weeks of gestation, and it decreases through the process of placental migration to be around 4 – 6 /1000 births between 34 and 39 weeks.(2)

Placenta accreta is characterized by abnormally adherence of the placenta to the uterine wall's superficial layer. Placenta accreta encompasses various classifications that are distinguished by the extent of uterine wall involvement. (3)

Placenta previa is the most prevalent independent risk factor for placenta accreta, while a previous cesarean scar is the modifiable factor that exhibits the strongest association with this condition. (4)

Placenta accreta spectrum (PAS) disorders have become a significant obstetrical issue that may endanger the life of the patients due to its associated complications and comorbidities besides its rising incidence from 0.12 to 0.31% during the last 3 decades. (5)

Injury to the urinary bladder is a prevalent complication associated with cesarean sections.

The incidence of this phenomenon ranges from 0.08% to 0.94% among cesarean sections. The presence of multiple cesarean sections, placenta previa, and any form of PAS disorders are recognized as significant risk factors for urinary tract injuries after cesarean birth. [6]

The incidence of urinary bladder injury ranges from 15% to 43% in cases of placenta accreta, and is even more in placenta percreta cases. [7]
The utilization of bladder dissection methods has the potential to decrease the occurrence of bladder injuries. Two primary procedures for bladder dissection have been identified: the lateral approach technique via the broad ligament, and the central classical technique.[8] The lateral approach technique, involves accessing the broad ligament, and initiated by creating an incision at the most lateral position in close proximity to the right round ligament. Alternatively, the right round ligament can be clamped and ligated to facilitate the procedure. [8]

The central classical technique involves the construction of a bladder flap by making a superficial incision and dissecting the peritoneal lining. This procedure is performed to separate the urinary bladder from the lower uterine segment. [9]
The consequences associated with urinary bladder injury include increased operative time, blood loss, postoperative urinary leakage, bladder wall irregularity and urinary reflux. [10]
To our knowledge, a few studies was done on efficacy of broad ligament approach on urinary tract injuries in placenta previa and placenta accrete spectrum patients.

This study aims;
To compare the urological outcomes of two different approaches in urinary bladder dissection, lateral and classical central approaches, in placenta previa and placenta accrete spectrum disorders cases in Minia maternity and children university hospital.

Materials and Methods

Study design and study participants:
A case controlled study including patients with low lying placenta suspected to be with PAS disorders based upon ultrasound findings (two-dimensional ultrasound and Doppler ultrasound) was conducted at Minia maternity hospital – Minia University during the duration from January to September 2022.

Inclusion criteria:
All patients suspected prenatally as PAS disorders by 2D Ultrasound and color Doppler.

Exclusion criteria:
Patients with other associated uterine pathologies requiring hysterectomy and patients refused to participate in the study were excluded from the study.

Study procedure:
In this study; all pregnant women suspected with placenta accreta spectrum disorders antenatally and scheduled for different modalities of management either cesarean hysterectomy, leaving the placenta in situ or the conservative surgical management were recruited.

Evaluation of all patients involved:
- *History taking*: this included personal history, demographics, obstetric and gynecologic history, past medical and surgical history.
- *Two dimensional ultrasound:* All examinations were performed with two-dimensional ultrasound system equipped with a 7-MHz trans-abdominal transducer, with utra-sound machine model e.g. Voluson S.8 - GE Healthcare, USA.
  The placenta was imaged with a sufficient bladder volume to clearly visualize the serosa - bladder interface with considering the criteria for diagnosis of PAS.
- *Color Doppler:* Abnormal color Doppler imaging patterns in the form of disturbance of the normal continuous color flow appearance leading to a gap in myometrial blood flow evaluated with color Doppler imaging., Also multiple large blood vessels are often seen surrounding the myometrium bridging vessels, utero-vesical hyper-vascularity, sub-placental hyper-vascularity, placental lacunae feeder vessels.
- *Basic routine investigations:* Involving Complete Blood Count (CBC), liver function tests, kidney function tests, and coagulation profile.

- *Blood booking of 4 units* of cross matched blood and fresh frozen plasma.

Operative intervention and bladder dissection:

Cesarean section with a pfannenstiel incision under general anesthesia was performed in all cases. Uterus was transversely incised higher than the placental origin level to avoid severe bleeding then the uterus was exteriorized after delivery of the baby.

The broad ligament was incised from the most lateral point just close to right round ligament or the right round ligament was clamped and ligated .

Then a space between the anterior and posterior leaflets of the broad ligament was opened through blunt separation of them then a space was opened through the posterior leaflet of the broad ligament .

The next step was ligation of both uterine arteries for reduction of the associated intra-operative bleeding. Then the index finger of the right hand is swept from lateral to medial to push through pupocervical fascia, once the bladder wall was identified we moved it down after dissection of the dense adhesions under vision and with finger guidance .

The uterus was taken upward and to the opposite side during creation of lateral window then it was centralized upward posteriorly to give more counter traction. It was preferred pushing the bladder entirely from one side so when adequate amount of dissection was done, the opposite side is dissected too to complete the bladder dissection .

After bladder dissection and exposure of the lower uterine segment we take the decision of whether hysterectomy or conservative surgery will be more appropriate according to the clinical and surgical evaluation.

The main study outcomes included the incidence of urinary bladder injury, ureteric injury, and cesarean hysterectomy were documented besides the consequences of operative time, intra operative blood loss and blood replacements and maternal morbidities and mortalities like gastro-intestinal tract (GIT) injuries, intensive care unit (ICU) admission, post-operative ileus, deep venous thrombosis (DVT), fistula and pelvic hematoma were recoded.

Statistical analysis:

- Shapiro-wilk test was applied on our data to detect the normal distribution of our variables and were not normally distributed; so data presented as median with range for continuous variables and by frequencies and percentages for categorical variables.
- Differences between groups were examined by independent Mann Whitney U-test or chi square when appropriate.
- A p value of ≤ 0.05 is considered as statistically significant in all analyses.
- Data were analyzed using the Statistical Package for Social Science version 22 (SPSS Inc.; Chicago, IL, USA).

Ethical considerations:

A written consent was obtained from all participants in this study and ethical approval was sought from the local ethical committee in the department then institutional ethical approval under the reference number **MUEOB00103.**

Results

A case control study was conducted in Minia university hospital included 111 pregnant women suspected with placenta accreta spectrum disorder based upon ultrasound findings by two dimensional and colour Doppler ultrasound.

The median maternal age of our populations' cohort was 33 years with a range from 19 – 41 years and the mean gestational age at delivery was 37 weeks gestation with a range from 16 – 38 weeks; the general and clinical characteristics of our populations' cohort are showed in table 1.

All recruited patients were operated under general anesthesia, with neither intra operative ureteric and GIT injuries nor postoperative fistula.

Our participants were divided according to bladder dissection into 2 groups; central and lateral bladder dissection, figure 1.

Our groups were studied according to general

and clinical characteristics, ultrasound and Doppler findings, clinical significance and surgical outcomes, table 2.

Comparing the two groups according to bladder dissection showed no significant differences between the 2 groups regarding the general and clinical characteristics, ultrasound and Doppler findings.

The clinical significances by two dimensional and Doppler ultrasound were significantly different between the 2 groups of bladder dissection; suspicion of parametrium invasion was more prevalent among the lateral group cases (P=0.005), probability of AIP was higher among lateral dissection group (P=0.002) and extent of AIP was more diffuse among the lateral group cases (P=0.034) .
The incidence of urinary bladder or ureteric injury did not differ with the type of bladder dissection; bladder/ureteric injury was a complication of 17.65% of central bladder dissection group in comparison to 7.7% in lateral bladder dissection group (P > 0.05).

Hysterectomy was done in 5.9% of central group cases and 26.9% of lateral group cases with a significant difference between the two groups (P = 0.006).

Regarding gastro-intestinal and vascular complications associated with cesarean deliveries, there was neither bowel injury nor internal iliac artery injury nor ligation in all our participants . One case of each group was admitted to ICU post-operatively while 4 cases in central group had post-operative ileus in comparison to one case in lateral group with no significant difference between them.

Post-operative DVT was a complication of one patient in each group and no one had post-operative fistula with no significant difference between them.

The post-operative surgical site infection was a complication of two patients of central group and one case of lateral group while pelvic hematoma complication is evident in 2 patients of central group and one patient of lateral group with no significant difference between them.

The surgical outcomes accompanied with the caesarian section deliveries of our groups showed smooth separation of placenta from endometrium 83.5% of central group in comparison to 61.5% in lateral group, 10.6% triple p technique in central group in compassion to 11.5% in lateral group and 5.9% had hysterectomy in central group in comparison to 26.9% in lateral group with a significant difference between the two groups (P = 0.004), table 2.

Furthermore, we categorized our participants according to the intra-operative outcomes and histopathological analysis into placenta Previa and placenta Previa accrete; the PAS was evident in 24 cases of our patients` cohort in comparison to 87 cases were diagnosed as placenta previa, then we studied the differences between the central and lateral bladder dissection and incidence of urinary bladder/ ureteric injuries, table 3.

Table 1: General and clinical characteristics of our patients` cohort (N=111):

Variables	**Median with range or number (%)**
Maternal age (Years)	33 (19 – 41)
Gestational age (Weeks)	37 (16 – 38)
Type of bladder dissection	
Central dissection	85 (76.6%)
Lateral dissection	26 (23.4%)
Clinical characteristics	
History of previous C.S	108 (97.3%)
Number of previous C.S	3 (0 – 7)
History of surgical evacuation (D&C)	23 (20.7%)
Operative time (min)	130 (95 – 240)
Postoperative hospital stay (days)	2 (1 – 4)
Need for re-exploration	1 (0.9%)
Surgical complications	
Urinary bladder injury	17 (15.3%)
Hysterectomy	12 (10.8%)
ICU admission	2 (1.8%)
Post-operative ileus	5 (4.5%)
Post-operative DVT	2 (1.8%)
Post-operative surgical site infection	3 (2.7%)
Post-operative pelvic hematoma	3 (2.7%)
Surgical outcomes	
Spontaneous separation	87 (78.4%)
Triple P technique	12 (10.8%)
Hysterectomy	12 (10.8%)
Blood replacement	
Packed RBCs units	2 (0 – 7)
Plasma units	1 (0 – 3)
Estimated blood loss (cc)	1500 (500 – 4200)
Massive blood transfusion > 6 Units	3 (2.7%)

Table 2: Comparison between central and lateral dissection groups:

	Central group N=85	***Lateral group N=26***	***P-value***
Maternal age (Years)	32 (19 – 41)	33 (23 – 39)	*NS*
Gestational age (Weeks)	37 (16 – 38)	37 (18 – 38)	*NS*
Conception by induction	3 (3.53%)	3 (11.54%)	*NS*
History of surgical evacuation	16 (18.8%)	7 (26.9%)	*NS*
Gravida	5 (2 – 11)	5.5 (2 – 8)	*NS*
Parity	3 (1 – 8)	3.5 (1 – 6)	*NS*
History of previous abortion/s	38 (44.7%)	15 (57.7%)	*NS*
Number of abortions	2 (1 – 4)	1 (1 – 2)	*NS*
History of previous C.S	82 (96.5%)	26 (100%)	*NS*
Clinical significance			
Suspicion of parametrium invasion			
Present	4 (4.7%)	4 (15.4%)	
Not present	79 (92.9%)	18 (69.2%)	*0.005*
Unsure	2 (2.4%)	4 (15.4%)	
Probability of AIP			
Low	48 (56.5%)	11 (42.3%)	
Intermediate	27 (31.8%)	4 (15.4%)	*0.002*
High	10 (11.7%)	11 (42.3%)	
Extent of AIP			
Diffuse	25 (29.4%)	14 (53.8%)	*0.034*
Focal	60 (70.6%)	12 (46.2%)	
Surgical complications			
Urinary bladder injury	15 (17.65%)	2 (7.7%)	*NS*
ureteric injury	0 (0%)	0 (0%)	*NS*
Hysterectomy	5 (5.9%)	7 (26.9%)	*0.006**
GIT injuries	0 (0%)	0 (0%)	*NS*
ICU admission	1 (1.2%)	1 (3.8%)	*NS*
Post-operative ileus	4 (3.6%)	1 (3.8%)	*NS*
Post-operative DVT	1 (1.2%)	1 (3.8%)	*NS*
Post-operative fistula	0 (0%)	0 (0%)	*NS*
Post-operative surgical site infection	2 (2.4%)	1 (3.8%)	*NS*
Post-operative pelvic hematoma	2 (2.4%)	1 (3.8%)	*NS*
Surgical outcomes			
Smooth separation	71 (83.5%)	16 (61.5%)	*0.004**
Triple P technique	9 (10.6%)	3 (11.5%)	
Hysterectomy	5 (5.9%)	7 (27%)	
Blood loss and replacement			
Blood loss (cc)	1500 (500 – 4200)	1500 (500 – 4100)	*NS*
Packed RBCs units	2 (0 – 7)	2 (0 – 6)	*NS*
Plasma units	0 (0 – 2)	1 (0 – 3)	*NS*

Table 3: Comparison between placenta Previa and placenta accrete regarding bladder dissection approach:

	Placenta Previa (N=87)		P - Value
Bladder dissection	**Central (N=71)**	**Lateral (N=16)**	
UB/Ureteric injury	**12 (17%)**	**0 (0%)**	**0.021***
	Placenta Accreta (N=24)		**P - Value**
Bladder dissection	**Central (N=14)**	**Lateral (N=10)**	
UB/Ureteric injury	**3 (21.4%)**	**2 (20%)**	**NS**

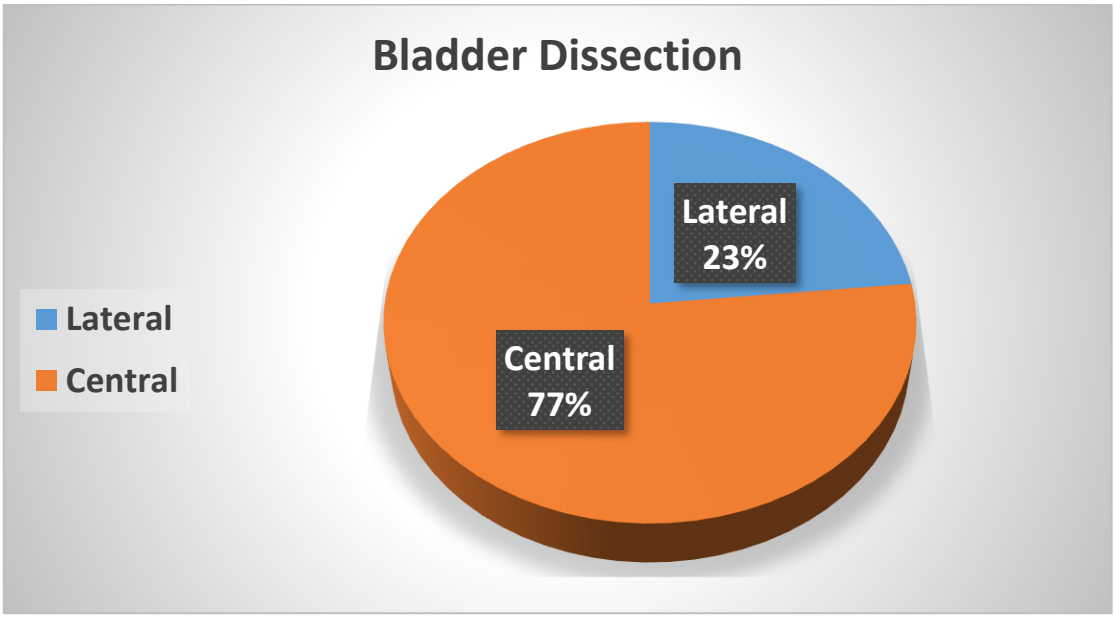

Figure 1: Central and lateral bladder dissection percentages:

Discussion

Placenta Previa and Placenta Accreta Spectrum are ones of the terrible complications of repeated caesarian sections among developing countries. Lower urinary tract injures are the most common associated complications of caesarian deliveries[11] and with PAS surgeries increases this incidence especially with a previous uterine scars. To our knowledge, this study is one of the few studies discussing the central and lateral urinary bladder approaches during placenta previa and placenta accrete surgeries. The most important risk factors are previous caesarean delivery, previous uterine surgeries, multi-parity and advanced maternal age. [12]

Pathogenesis of PAS most likely to be the absence of the normal decidua basalis, usually due to previous surgical trauma and/or uterine scarring, and the resulting pathological invasion of the trophoblast into myometrium when the placenta implantation occurs at the site of previous scarring. [13]

The main lines of management includes cesarean hysterectomy which is the gold standard and triple p technique. These maneuvers are preceded with urinary bladder dissection which has two approaches; central and lateral approaches. [14]

Pelvic adhesions are consequent of multiple cesarean deliveries with subsequent difficulties with bladder dissection during subsequent gynecologic surgeries especially hysterectomy. Dissecting the urinary bladder dome adhered to the lower uterine segment should be meticulous to avoid the urinary bladder injuries. More than

20% of females with more than 3 previous cesarean sections are vulnerable to cystostmy. [15]

This study illustrates that using lateral approach technique of bladder dissection significantly reduced the incidence of bladder injury among the placenta previa cases and did not affect the incidence of bladder injury among the placenta accrete patients.

These results are in consistence with Ibrahim Saif Elnasr who recruited 200 women with placenta accrete with at least previous one caesarian section and divided them into 2 groups, 100 women in each. Group I was operated using central classical technique of bladder dissection and the other group was operated using broad ligament (lateral) approach.[8] Urinary bladder injury is considered the most frequent and important surgical hazardse especially during hysterectomy and cesarean sections. [16]

These results are consistent with Ibrahim Saif Elnasr, who compared the outcomes of central and lateral approaches of bladder dissection on 150 cases of hysterectomy with previous C.S. Ibrahim Saif Elnasr, 2018 founded that; during total abdominal hysterectomy the lateral approach of bladder dissection was safer and faster in preventing urinary bladder injuries when compared to the classical central approach of bladder dissection. [17]

Our results also inconsistent with Chang et al., who showed that lateral approach dissection of urinary bladder reduces the incidence of urinary bladder injuries especially during laparoscopically assisted vaginal hysterectomy with previous caesarian sections. [15]

In our data, Hysterectomy was significantly higher in lateral approach technique patients (27% in lateral approach patients versus 6% in central approach with a significance level of 0.006), this seems contradictory to Ibrahim Saif El Nasr [8] but we can explain that by the fact that 10 (38.5%) cases of broad ligament approach technique were placenta accrete in comparison to 14 (16.5%) cases of central approach patients were placenta accrete – data not shown – with a significant difference between them (P=0.017)

This means that the prevalence of placenta accrete among the lateral approach technique patients was significantly higher than the central approach patients and this increased the incidence of hysterectomy among the lateral approach patients regardless of the bladder dissection technique.

Despite the incidence of urinary bladder injury among central approach patients (17.7%) is higher that lateral approach patients (7.7%), but with no significant difference between the two groups. This is can be attributed to the low sample size of our patients` cohort besides the higher prevalence of placenta accrete among the lateral approach group of patients.

The estimated blood loss and operation time among our patients cohort did not differ between the two groups of bladder dissection approaches, but it is more affected by the type of the technique used according to degree of invasion or even was completely separated. The average median of blood replacement was 2 units of packed RBCs and this clarifies that patient outcomes are improved and the associated complications are reduced over time with increasing experience especially in well-established multidisciplinary centers, these results are consistent with Shamshirsaz AA, et al.,[18]

Despite Einerson and Branch supposed that urinary bladder injuries occur in about one third of PAS patients especially who undergoing cesarean hysterectomy even in experienced hands, the incidence of bladder injury among our patients cohort was 15.3% and in placenta accrete group 20.8%, this can be attributed to higher prevalence of PAS among our community and the growing expertise in PAS surgeries. [19]

Our results are contradictory to the study conducted by Abbas and Osman; where the frequency of bladder injury was more than 2.3% among 570 patients recruited in their study had abdominal hysterectomy, [20] this high incidence may be due to bladder dissection in classic approach.

Regarding the operative time, estimated blood loss, number of blood and plasma units transfused, postoperative hospital stay, intensive care unit admission, postoperative fever surgical site infection and paralytic ileus were of no significant difference between the two groups, this is contradictory to Ibrahim Saif El Nasr who assumed a significant difference between the lateral and central bladder dissection groups (8). This can be attributed to the low sample size of the lateral group of our patients' cohort besides the recruited cases were not all placenta previa accrete which subsequently affected the incidence of associated complications of PAS surgeries.

This study is one of the few studies to evaluate the outcomes of central and lateral bladder dissection approaches in PAS patients besides the efficacy of different surgical modalities in a placenta previa and placenta accreta cases.

This study has few limitations including, the low sample size of placenta accrete cases, the different surgical techniques used intra-operative.

This study clarify the importance of broad ligament bladder dissection approach technique in reducing urinary tract injuries in PAS surgeries.

References

1. Schneiderman M, Balayla J. A comparative study of neonatal outcomes in placenta previa versus cesarean for other indication at term. The Journal of Maternal-Fetal & Neonatal Medicine. 2013;26(11):1121-7.
2. Faiz AS, Ananth CV. Etiology and risk factors for placenta previa: an overview and meta-analysis of observational studies. The Journal of Maternal-Fetal & Neonatal Medicine. 2003;13(3):175-90.
3. Oyelese Y, Smulian JC. Placenta Previa, Placenta Accreta, and Vasa Previa. Obstetrics & Gynecology. 2006;107(4).
4. Eshkoli T, Weintraub AY, Sergienko R, Sheiner E. Placenta accreta: risk factors, perinatal outcomes, and consequences for subsequent births. American Journal of Obstetrics and Gynecology. 2013;208(3): 219.e1-.e7.
5. El Gelany S, Mosbeh MH, Ibrahim EM, Mohammed Mm, Khalifa EM, Abdelhakium AK, et al.,. Placenta Accreta Spectrum (PAS) disorders: incidence, risk factors and outcomes of different management strategies in a tertiary referral hospital in Minia, Egypt: a prospective study. BMC Pregnancy and Childbirth. 2019;19(1):313.
6. Abd El-Gaber AE-N, Ahmed MA, Khodry MM, Abbas AM. Could bladder inflation prior to cesarean section prevent urinary tract injury in high risk group? A randomized controlled trial. Open Journal of Obstetrics and Gynecology. 2019;9(2): 207-15.
7. Silver RM, Fox KA, Barton JR, Abuhamad AZ, Simhan H, Huls CK, et al.,. Center of excellence for placenta accreta. American Journal of Obstetrics and Gynecology. 2015;212(5):561-8.
8. El IS. Broad ligament approach for bla obstetrics and urological mor placenta. 2019.
9. Tuuli MG, Odibo AO, Fogertey P, Roehl K, Stamilio D, Macones GA. Utility of the Bladder Flap at Cesarean Delivery: A Randomized Controlled Trial. Obstetrics & Gynecology. 2012;119(4).
10. Salman L, Aharony S, Shmueli A, Wiznitzer A, Chen R, Gabbay-Benziv R. Urinary bladder injury during cesarean delivery: Maternal outcome from a contemporary large case series. European Journal of Obstetrics & Gynecology and Reproductive Biology. 2017;213:26-30.
11. Oliphant SS, Bochenska K, Tolge ME, Catov JM, Zyczynski HM. Maternal lower urinary tract injury at the time of Cesarean delivery. International Urogynecology Journal.2014;25(12):1709-14.
12. Fahmy OM, Aitallah AS, Abdelghafar HM, Abdelhafez MY, Khalifa AA. Fetal and Maternal Outcomes in Cases of Morbidly Adherent Placenta in Sohag University Hospital: Observational Study. The Egyptian Journal of Hospital Medicine. 2021;83(1):935-9.
13. Silver RM, Branch DW. Placenta Accreta Spectrum. New England Journal of Medicine. 2018;378(16):1529-36.

14. Belfort MA. Placenta accreta. American Journal of Obstetrics and Gynecology. 2010;203(5):430-9.
15. Chang WC, Hsu WC, Sheu BC, Huang SC, Torng PL, Chang DY. Minimizing bladder injury in laparoscopically assisted vaginal hysterectomy among women with previous cesarean sections. Surgical Endoscopy. 2008;22(1):171-6.
16. Aronson MP, Bose TM. Urinary tract injury in pelvic surgery. Clinical obstetrics and gynecology. 2002;45(2):428-38.
17. Elnasr IS. Lateral Approach Technique to Minimize Bladder Injury During Abdominal Hysterectomy in Cases with Previous Cesarean Sections: An Observational Study. Journal of Gynecology and Women's Health. 2018.
18. Shamshirsaz AA, Fox KA, Erfani H, Clark SL, Salmanian B, Baker BW, et al.,. Multidisciplinary team learning in the management of the morbidly adherent placenta: outcome improvements overtime. American Journal of Obstetrics and Gynecology. 2017;216(6):612.e1-.e5.
19. Einerson BD, Branch DW. Surgical Management of Placenta Accreta Spectrum. Clinical Obstetrics and Gynecology. 2018; 61(4).
20. ABBAS TR, OSMAN MM. Urological Injuries during Obstetric and Gynecological Surgical Procedures: Two Centers Experience. The Medical Journal of Cairo University. 2011;79:261-65.