Assessment of the urinary bladder prior to cesarean delivery in women with multiple abdominal scars through operation table ultrasonography: a case report

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Bladder injury during cesarean delivery
Bladder injury is a rare but serious complication that can occur during cesarean deliveries (CDs) and may lead to prolonged morbidity and hospitalization of women. Injuries, when identified intraoperatively, lead to prolonged operative times and the need for potential additional urologic surgical assistance, especially if the bladder dome and ureters are involved. Furthermore, unrecognized bladder injuries may lead to serious complications with high morbidity because of the development of urinary ascites and peritonitis and the formation of fistulas. These cases are difficult to manage and impose high physical, psychological, and social burdens. Postoperative recovery can be complicated by secondary infection, bladder dysfunction, and a need for repeated surgical procedures. Ultrasonography is an easy and cost-efficient tool to obtain precise mapping of the operating site to allow adaptation of the intraoperative strategy to the existing anatomic conditions.

A case history and management approach
We report on a 36-year-old primipara admitted to the obstetrical department of the Charité University Hospital at 39 weeks of gestation for induction of labor for the indication of a small-for-gestation-age fetus and hypertension in pregnancy. The patient had 3 previous surgical procedures, namely an open midline laparotomy for a perforated appendicitis, followed by a laparoscopic adhesiolysis for an adhesive ileus and another laparoscopic procedure as part of fertility treatment. The patient reported having difficulty emptying her bladder, however, there was no previous urogynecologic assessment at the time. In view of the previous abdominal operations, we decided to perform an abdominal sonography of the mother to map the bladder anatomy. The ultrasound revealed an abnormally high-situated urinary bladder, which extended up to the level of the umbilicus (Figure 1, A). The fetus was in cephalic presentation with an estimated weight of 2900 g and 3 loops of nuchal cord. Fetal Doppler parameters and cardiotocography (CTG) monitoring were normal. The options for delivery were discussed, and induction of labor was recommended. Before labor was induced, measures were taken to minimize the risks of bladder injury in case of an emergency CD. These included, first, to identify the upper limit and outlines of the urinary bladder by transabdominal ultrasound with a longitudinal midline view (Figure, A). The option of a midline laparotomy through the previous incision with a high entry point through the
peritoneum into the abdominal cavity, as opposed to a transverse lower abdominal Pfannenstiel incision with an increased risk for bladder injury were discussed. During labor, because of a suspicious CTG, a decision was made to perform a CD. In the theater, a repeat transabdominal ultrasound scan was performed on the operating table before cleaning and draping. Even after bladder emptying with a Foley catheter, the upper limit of the urinary bladder was still located up to the level of the umbilicus on ultrasound (Figure, B). A longitudinal midline incision was chosen, and the peritoneum was carefully entered subumbilically through a small window. The bladder seemed to balloon on the inferior side of the peritoneal window, obstructing the access to the lower uterine segment (Figure, C). The bladder was carefully mobilized into the pelvis. In the same manner, small intestine adhesions were mobilized caudally.
The anterior uterine segment was incised in a longitudinal fashion because the access to the lower uterine segment was still obstructed and the risk for potential bladder injury was increased. Therefore, the baby was delivered via reverse breech and the 3-fold wrapped nuchal umbilical cord was unwrapped. The uterine incision was repaired in 2 layers with interrupted sutures (Figure, D). Retrograde filling of the bladder with methylene blue was performed to visualize potential unrecognized bladder injuries, which were excluded. The patient was stable at completion of the procedure.

Discussion
The leading risk factor for bladder injury is previous abdominal surgeries, such as a CD or, in our case, repeated laparoscopic procedures.1,3 Adhesions may also be caused by infection or inflammatory disease such as endometriosis.3 One approach to reduce bladder injury uses retrograde cystoinflation with a saline solution to visualize the bladder outline intraoperatively. However, this procedure is not standardized and may prolong the operative time, require extra expertise, and may not be suitable in an obstetrical emergency.4 Traditionally, when bladder injury is suspected, a dye test with methylene blue is performed.5 Although a few reports indicate that accidental bladder injury during a CD, when adequately repaired, may not be associated with complications, we advocate that any bladder injury should best be avoided when possible.6

Conclusion and recommendations
Preoperative urinary drainage only before incision may be inadequate to prevent bladder injury, particularly among those patients with multiple abdominal scars. Therefore, we recommend that a preoperative midline abdominal ultrasound should be performed before the incision for women with a history of multiple abdominal surgery, particularly with midline incisions. This may help to identify an anatomically high urinary bladder so that the surgeon can modify the entry into the peritoneal cavity above the bladder and avoid injury and complications.

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