

## Iatrogenic Bladder Injuries; Frequency and Management during Obstetric Non-Malignant Procedures

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### ABSTRACT

**Objective:** To find the frequency and management outcome of bladder injuries in cesarean section operations.

**Study Design:** Cross-sectional study.

**Place and Duration of Study:** Combined Military Hospital, Okara Pakistan, from Nov 2019 to Nov 2020.

**Methodology:** After Ethical Review Committee, approval 1040 patients who underwent cesarean sections were included. Bladder injuries occurring during cesarean sections and their management outcomes were noticed.

**Results:** The frequency of bladder injury was 214(20.6%), with the number of injuries as 482(48.3%) for primary cesareans and 345(33.2%) for repeat cesareans. The surgeon was called for help in 195(18.8%) cases, and 27(2.6%) cases were transferred to the tertiary care centre. No mortality was noticed during the study.

**Conclusion:** The chances of bladder injuries can be minimized but will never be zero because of the anatomical development similarities of both tracts. It is pertinent to note that bladder injuries are the most common in obstetrics and gynecology surgeries.

**Keywords:** Bladder injury, Cesarean sections, Obstetric surgery, Pregnancy, Risk factors.

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### INTRODUCTION

Various iatrogenic injuries occur in obstetrics and gynaecological procedures, which vary and depend on multiple factors. Emergency surgery, increased workload, surgery by junior doctors in training institutes and poor communication among doctors are the few commonest contributing factors.<sup>1</sup> It is pertinent to note that the proximity of female genital organs and urinary organs occurring during development is a major contributing factor for these injuries, thus making this a zero possibility.<sup>2</sup> Thus, the risk of these injuries can be minimized but cannot be zero due to developmental susceptibility.<sup>3</sup> The first reported bladder injuries are reported in the opus and are common in these surgeries.<sup>4</sup> It is a common fear among obstetricians and gynaecologists that injury to the ureter will occur in a few cases during these operations.<sup>5,6</sup> Traditionally, a rate of 50 and 75% of iatrogenic ureteric injuries are reported, which is very high because the ureter lies very close to female reproductive organs throughout its course.<sup>7,8</sup> This problem has been on the rise in our hospitals, and contributing factors are a multitude. The state-of-the-art surgical centres have also reported cases of bladder injury or some related injury to the urinary tract.<sup>9</sup> Study was carried out to find the

frequency and management outcome of bladder injuries in cesarean section operations.

### METHODOLOGY

The cross-sectional study was conducted from November 2019 to November 2020 at Combined Military Hospital, Okara Pakistan, after approval from the Hospital Ethical Committee (IERC/Anaes/2021/02). The sample size for the study was calculated using the WHO sample size calculator, taking reported prevalence of 0.08-0.94%.<sup>10</sup>

**Inclusion Criteria:** All elective and emergency cases presenting for cesarean sections were included in the study.

**Exclusion Criteria:** Abnormal placentation cases cesarean followed by hysterectomy were excluded.

The subjects were selected by probability consecutive sampling technique from the hospital operation theatre list. All cases presenting for surgery were recruited. After Ethical Review Committee, approval 1040 patients who underwent cesarean sections were included. Bladder injuries occurring during cesarean sections and their management outcomes were noticed. The patient's demographic data, type of injury, management technique and outcome of bladder injury were recorded for analysis.

Statistical Package for Social Sciences (SPSS) version 24.0 was used for the data analysis. Quantitative

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variables were expressed as Mean±SD and qualitative variables were expressed as frequency and percentages. Chi-square test was applied to explore the inferential statistics. The *p*-value of ≤0.05 was set as the cut-off value for significance.

## RESULTS

A total of 214(20.6%) cases of bladder injury were found out of 1040(100%). All patients were young females aged 20-37 years presenting for cesarean sections. The distribution of bladder injuries was such that primigravida 482(48.3%), multigravida 345(33.2%) and patients with abnormal placenta were 213(20.5%). The surgeon was called for bladder repair help in 195 (18.8%) cases. Tertiary care hospital referral was for 27 (2.6%) cases for further management by the urologist. The re-operated cases had the frequency of 133(12.8%). Spinal anaesthesia was given in 735(70.7%) cases, and general anaesthesia in 285(27.5%). Spinal was converted to general anaesthesia in 29(1.8%) cases due to operation requirements. In a large number of cesareans, 346(33.3%) had adhesions previously operated for some other abdominal operation or obstetric surgery. Table reports the summary of iatrogenic bladder injuries in cesarean sections.

**Table: Summary of Iatrogenic Bladder Injuries in Cesarean Sections (n=1040)**

Characteristics	Study Groups		<i>p</i> -value
	Group-A Bladder Injury	Group-B No Bladder Injury	
Bladder injury	214(20.6%)	826(79.4%)	0.001
Adhesions	346(33.26%)	694(66.7%)	0.177
Surgeon help	195(18.8%)	845(81.25%)	0.001
Tertiary care hospital	27(2.6%)	1013(97.4%)	0.001
Reoperation	133(12.8%)	907(87.2%)	0.001

## DISCUSSION

The frequency of bladder injuries is high in our hospital compared to other researchers, where bladder damage during cesarean section has been reported from 0.08-0.94%.<sup>11</sup> The likely increasing cesarean deliveries presenting in an emergency with abnormal placenta also add to complications in the form of urinary tract injury. However, fortunately, the lowest rate of morbidity and mortality was encountered in our hospital. Despite all these facts, it should be remembered that the most common complication is bladder injury, which is quoted as the most frequently injured organ during pelvic surgery.<sup>12</sup> Locke *et al.* were known for their largest case-control study of women undergoing cesarean sections in which 42 bladder injuries were found, and they suggested that the

chances of bladder injuries are higher after repeated cesarean sections.<sup>13</sup> Another factor is emergency surgery, where chances of bladder injury are high.<sup>14</sup> Both these factors were similar to our study, where emergency surgery and increased numbers of cesarean operations are common. Another contributing factor is adhesions due to previous operations, which have been an adding factor in different studies.<sup>15</sup> Rehman *et al.* have demonstrated that these injuries are more common in repeated cesareans due to adhesions from the previous cesareans.<sup>16</sup>

The surgical skill of the operating gynaecologist plays an important role in these injuries, which are a bit lacking in our setup. Similarly, the basic knowledge of the anatomy of the operative field is important for conducting dependable surgery for all operating doctors who need to be included. Remember that anatomically, the genital tract is closed to urinary organs, another predisposing factor for these injuries. Most authors have demonstrated that basic operative anatomy knowledge is important for preventing injuries.<sup>17,18</sup> An emerging factor for causation is operations done by the trainee doctors without supervision because the increasing workload has led to most bladder injuries, especially in our setups. The number of operating doctors is decreasing proportionately to handle cesarean deliveries. This is why a large no of cases are operated on without the supervision of the consultant gynaecologist, leading to iatrogenic bladder injuries.<sup>19</sup> The frequency of injuries by the consultant gynaecologist is low but does happen due to complicated surgeries. Moreover, the availability of surgeons is of great help in managing these cases if complications occur. Although the urologist is the best to manage these injuries, we only had surgical specialists, whereas the complicated cases were referred to tertiary care hospital.

We have limited our study to bladder injuries while excluding other urinary tract injuries primarily closed during surgery. It is a general agreement regarding treatment options for primary bladder repair. The primary repair has fewer chances of complications, and the same strategy was adopted in our study. No mortality or morbidity was noticed.

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## LIMITATION OF STUDY

The study was limited by the fact that this study was a cross-sectional study of our hospital where the trainee

doctors were doing unsupervised operations, which resulted in many bladder injury cases.

### CONCLUSION

The chances of bladder injuries can be minimized but will never be zero because of the anatomical development similarities of both tracts. It is pertinent to note that bladder injuries are the most common in obstetrics and gynaecology surgeries. To prevent these devastating injuries, a multi-factorial approach is recommended in supervised training, regular urology rotation during training and improvement in basic surgical skills. Moreover, rational workload distribution and team effort of different specialities can save lives in our hospitals where workload increases gradually.

**Conflict of Interest:** None.

### Authors Contribution:

Following authors have made substantial contributions to the manuscript as under:

MA: Study design, drafting the manuscript, data interpretation, critical review, approval of the final version to be published.

ZBK: Data acquisition, data analysis, drafting the manuscript, critical review, approval of the final version to be published.

HZ: Concept, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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