

## Laparoscopic Single Layer Repair by Unidirectional V-Loc Vicryl of Traumatic Isolated Intraoperative Urinary Bladder Tear

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## Abstract

## Case Report

Traumatic intraperitoneal bladder rupture is a surgical emergency. It is commonly associated with pelvic fracture or a direct blow to the lower abdomen in a distended bladder. Once diagnosis is made and following initial resuscitation as advocated per Advance Trauma Life Support (ATLS) guidelines, patients are brought to the operation theatre. In selected patients who are hemodynamically stable, laparoscopic repair with single or double layer technique is a procedure of choice as it can avoid laparotomy and its associated morbidity. This can be further accomplished by using new type of suture material barbed, knotless, unidirectional absorbable suture V-Loc (Vicryl)(by Covidian) which will allow the repair to be smooth and faster. Herein, we report 3 cases of traumatic intraperitoneal bladder rupture using V-Loc suture that made an uneventful recovery.

**Keywords:** Bladder rupture, Laparoscopic repair, barbed suture, V-loc.

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### INTRODUCTION

Traumatic intraperitoneal bladder rupture is a surgical emergency [1, 2]. It is commonly associated with pelvic fracture or occurs as a result of direct blow to the lower abdomen in a distended bladder [1, 2]. Laparoscopic repair with single or double layer technique is a procedure of choice in selected patients as it can avoid laparotomy and its associated morbidity. This can be further accomplished by using new type of suture material barbed, knotless, unidirectional absorbable suture V-Loc (Vicryl)(by Covidian) [3] which will allow the repair to be smooth and faster, using just two 5mm ports only. One for the pneumoperitoneum plus the telescope and the other port for the needle holder. We share our experience in managing 3 cases of traumatic intraperitoneal bladder rupture using V-Loc suture.

### CASE REPORTS

#### Case 1

A 39 year-old lady, alleged to have rammed by a tractor on her left side of her body. She complained of lower abdominal pain and inability to get up & walk due to pain. In the emergency department, she was alert with stable vital signs. Pelvic spring test positive. The

lower abdomen distended and tender. Minimal urine in the urine bag and blood stained. Focused Assessment with Sonography for Trauma (FAST) scan demonstrated free fluid in the pelvis. Pelvic X ray, showed left superior and inferior pubic rami fracture with sacroiliac dislocation. Computed Tomography (CT) abdomen gave the findings of under filled urinary bladder and presence of free fluid with no solid organ injury. Upon review, the lower abdomen revealed peritonism. Decision for a diagnostic laparoscopy and proceed made. Insertion of laparoscope, showed 2-3 cm tear at the dome of bladder. Rest of the hollow & solid organs normal. A further 5mm port inserted under vision in the left iliac fossa. The rent in the bladder was repaired in a single layer using V-Loc 3-0 suture. Upon completion of procedure, it was tested for leakage by flushing water through the Foleys catheter. The bladder bulge maintained with no leak. An intraperitoneal drain brought out through the 5mm trocar site. Post-operative course was uneventful and drain removed on day 2, continuous bladder drainage (CBD) maintained for 3 weeks. Catheter removed without doing any cystogram as she did not complain of fever or there were no high white blood cell (WBC) counts.

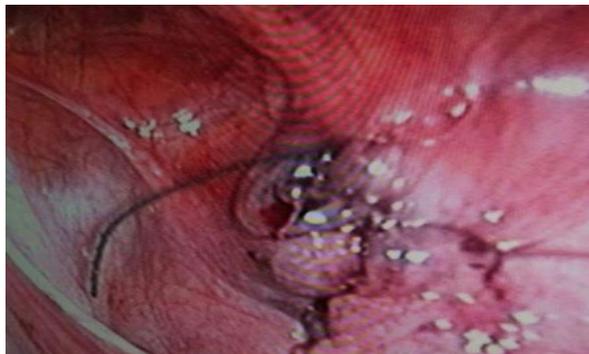


**Fig-1: A rent in the dome of the bladder during laparoscopy exploration**

**Case 2**

A 60 year-old pedestrian brought to emergency department after being hit by a car while crossing the road. He sustained fracture of the pelvis involving the acetabulum. CT pelvis revealed contrast leakage from urinary bladder intraperitoneally. Urinary bladder appeared contracted despite 300 mls contrast infusion

through the urinary catheter. Patient haemodynamically stable. A decision of diagnostic laparoscopy and proceed made. Laparoscopy, revealed a small perforation with bulging of the mucosa on the posterior wall of bladder. Repair performed using V-Loc 3-0 suture in single layer, after adding another 5mm port. Post-operative period uneventful.



**Fig-2: Intracorporeal suturing with V-loc suture**



**Fig-3: Foley's catheter balloon can be seen, bulging from the dome of the bladder in the background of retroperitoneal haematoma, hence making the field appears dark**



**Fig-4: Repaired of the rent by V-loc suture in continuous fashion**

### Case 3

A 36 year-old motorbike rider under alcohol influence, lost control and hit a car in front of him and had a direct impact to his lower abdomen. He complained of pain over the lower abdomen. In the emergency department he was confused with alcohol smell in his breath. Vital signs were stable. His lower abdomen tender and guarded. Urinary catheterization performed but no urine produced. FAST scan revealed free fluid intraperitoneally with irregular bladder wall. Intraperitoneal bladder rupture suspected because of

history and findings. On laparoscopy, his pelvic cavity was filled with blood stained urine and blood clots. Huge tear extending from the dome of bladder to almost to its base noted. Primary repair of the bladder laceration in single layer done using V-loc 3-0 suture. Silicone drain left intraperitoneally. The drain was removed on day 2 and patient was discharged home with CBD in situ. He was reviewed back in outpatient clinic after 3 weeks. Cystogram showed no leak and CBD was removed.



**Fig-5: Huge tear from the dome up to the base of the bladder the entire balloon of the Foley's catheter can be seen**



**Fig-6: Tension-free intracorporal bladder repair with V-loc suture in continuous fashion**

## DISCUSSION

Isolated traumatic urinary bladder rupture occurs in less than 2% of all blunt trauma cases. Most of the injuries are associated with pelvic fractures [1, 2]. To a lesser extent, bladder rupture also occurs from a blow to the lower abdomen on a distended bladder without the fracture of pelvis [2]. In intraperitoneal rupture, the dome of the bladder, being the weakest and mobile portion, is the most common area to be affected by blunt trauma to the abdomen [1, 2]. Case 1 and 2 did not have any urethral injury. Intraperitoneal rupture is a surgical emergency, conventionally managed by open repair, because in tertiary hospitals such cases will be operated by the primary surgical team, and later referred to Urologists. The laparoscopic bladder repair in trauma setting has been infrequent as haemodynamically unstable patients hinder laparoscopic intervention. However, in selected patients, laparoscopic intervention is possible.

As shown in several studies, there was no difference in outcome between single layer or double layer repair [1, 2]. As demonstrated in our cases, 2 of the patient had concomitant pelvic fracture while another patient was alcohol binge prior to the trauma. All patients were stable haemodynamically with no solid organ injury, and facilities for advanced laparoscopic work were available round the clock. Fracture of the pelvis was also stable and managed conservatively by orthopedic surgeons. Laparoscopic approach for bladder rupture can be time consuming moreover if it involved a huge tear as seen in case number 3. This is because it requires intracorporeal knotting when using smooth suture such as polyglactin (Vicryl TM), or polydioxanone (PDS II TM). Intracorporeal knotting is technically challenging unless it is performed by experienced Laparoscopic surgeons. In recent years, a new class of suture material –barbed uni-directional suture- has been introduced into the surgeon's kit [3]. Currently, there are 3 commercially available barbed suture products; The Quill SRS Bidirectional barbed suture product line (Angiotech Pharmaceuticals, Inc., Vancouver, BC, Canada) and the V-Loc absorbable Wound Closure Device Product Line (Covidien, Mansfield, MA), Ethicon has their Strata fixing suture material.

We performed a single layer primary repair using V-Loc suture in all of our cases. V –loc is an absorbable barbed suture that is commonly recommended in obstetrics and gynaecology surgery [3-5] especially in myomectomy, sacrocolpopexy and for vagina cuff closure after hysterectomy [5]. To our knowledge so far there was no published literature regards to the use of this suture for repair of the urinary bladder laceration full thickness in the trauma setting, the characteristics of barbed suture is it requires no knot to anchor the suture to the tissue [5]. This can be performed by inserting the needle into the loop at the end of the suture, then the traction on the suture causing

the barbed lock onto each other creating an anchor between the suture and the tissue. Though this, we can avoid the intracorporeal knotting and the process of repair is easier and faster

## CONCLUSION

Laparoscopy is safe, feasible and practical alternative to laparotomy in selected, haemodynamically stable patient with abdominal trauma. Laparoscopic repair of intraperitoneal bladder rupture using knotless, barbed suture is effective, faster and has a comparable outcome with conventional smooth suture. As the usage increases with more specialists, it can establish itself as the suture of choice, making urinary bladder repair as a single layer technique rather than in two or three layers as was previously taught conventionally in text books.

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