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Vascular Complications during Lumbar Laminectomy.

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ABSTRACT

Rare accidental laceration of major abdominal vessels during lumbar disc surgery is a serious complication. When it occurs can be sudden and life threatening. A 40-yr-old woman, operated on for an L4-L5 disc hernia, developed cardiovascular collapse after disc removal. This was treated with volume replacement and ephedrine, and surgery was hastened. On turning the patient supine there was abdominal distension, on opening there was a large retroperitoneal haematoma. During laparotomy, a laceration of the common iliac artery and both right and left iliac veins was repaired and massive blood loss replaced. The patient made a full recovery. In unexpected hypotension during lumbar laminectomy, accidental vascular damage should be suspected and treated immediately.

Keywords: Lumbar laminectomy, vascular injury, hypotension.

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INTRODUCTION

Lumbar spine surgeries are common in the neurosurgery department. But these surgeries are also associated with various complications such as neurological complications, peripheral nerve injuries due to positioning and eye complications. Major vascular injury is a relatively infrequent complication during lumbar disc surgery, incidence being 2.4% of lumbar laminectomies and the mortality rates ranging from 40 to 100% [1]. High mortality rates are attributed to rapid blood loss into the retroperitoneal space and delay in suspecting the cause for deterioration.

Case Report

A 40 year old female with no significant past history was posted for lumbar laminectomy & discectomy of L4 & L5 under ASA grade I. Preoperative investigations were as follows

Hb – 11.9 gms / dl , blood Urea – 18, Serum creatinine – 0.7 ; Blood sugar level , chest X-ray , ECG & Echo were within normal limits.

She was posted for surgery under General Anaesthesia. After shifting of the patient inside Operation theatre and connected to all monitors (ECG, NIBP, SpO₂ and ETCO₂) & vitals checked, found to be within normal limits. An intravenous line was secured with 18G Cannula. Premedicated with inj. Glycopyrrolate 0.2 mg, inj. Ondansetron 4 mg & inj. Ranitidine 50 mg Iv 5 min prior to surgery. She was oxygenated with 100% oxygen. Injection midazolam 1mg & inj. Fentanyl 100µgms were administered as preinduction doses IV. General anaesthesia was induced with inj. Propofol 2 mg/kg body weight & intubated under inj. Vecuronium 0.1 mg/kg body weight. After 3 mins of mask ventilation, intubated with 7 mm cuffed flexometallic ET tube & cuff inflated.

Anaesthesia was maintained with O₂ 30% + N₂ 70% and halothane 0.5 %. The patient turned to prone position & all pressure points were well padded. The patient was kept on intermittent positive pressure ventilation. All vital parameters were maintained in normal range during surgery. Injection Diclofenac Sodium 75 mg was given as slow IV infusion to maintain analgesia.

After 1 hr of induction during discectomy phase there was progressive fall of BP for which inj. Ephedrine 30 mg was given in incremental doses. There was no obvious blood loss. 1 liter of crystalloids were rushed in. In spite of this there was no improvement of BP. Surgeon closed the surgical site immediately & patient was turned to supine position. On examination the abdomen was found to be tense & four quadrant aspiration was positive for haemoperitoneum, General surgeon was called for opinion. One more peripheral line was started with 16 G Cannula & Right IJV Cannulated.

After assessment proceeded with laparotomy. On opening there was huge retroperitoneal clot. Vascular surgeon was called suspecting major vessel injury. On removing the clot there was blood loss around 2 to 2.5 litres. There was small rent in both common iliac arteries & left common iliac vein. Right Common iliac vein was shattered. After proximal and distal clamps applied, rents repaired primarily, right Common iliac vein was ligated & divided.

During this phase there was severe haemodynamic instability with BP recording 60/40 mm Hg, HR going upto 160/min. This was managed with 5 liters of crystalloids, 2 liters of colloids during which time blood was arranged. 4 units of whole blood, 4 units of FFP, & 2 units of platelets were transfused intraoperatively. Inj. Dopamine infusion at the rate of 10µ / kg / min was started. Throughout surgery urine output was monitored & found to be adequate.

After closure patient was reversed with Neostigmine 2.5 mg + Glyco 0.5 mg but not extubated, shifted to ICU with Ambu ventilation & connected to ventilator with assist control mode with FiO₂ 80%. On the same day drain fluid was 1600 ml. In ICU she was transfused 1 unit of blood & 1 unit of FFP. Vitals, CVP, urine output were monitored. Hb was 7 gm/dl postoperatively. Dopamine infusion continued at the same rate.

On 1st Post-operative Day[POD] patient was changed to SIMV mode & 1 unit of blood & 3 FFP transfused. Drain fluid dropped to 250 ml. Dopamine tapered to 5 μ /kg/min.

On 2nd POD patient was changed to spontaneous mode and then extubated. Drain fluid was almost 150 ml.

On 3rd POD Dopamine progressively tapered & stopped.

She was discharged on 15th POD. On discharge patient was conscious, alert, haemodynamically stable, ambulant & had no new neurological deficit. She was passing motion normally while back and abdominal wounds were healthy.

DISCUSSION

This patient had severe haemodynamic compromise and abdominal distension following lumbar laminectomy which led to search for a source of bleeding and proceed with emergency laparotomy.

The incidence of serious vascular damage, e.g. vascular fistulae, lacerations and pseudoaneurysms during lumbar disc surgery is 1-5 per 10000[2]. The mortality rate ranges from 25% to 61% depending on the time to diagnosis and length of the subsequent procedure [3]. Surprisingly, the incidence has not been reduced over the past 50 years[4].

The vessel that is injured depends on the level of the surgery. Vascular damage may involve the left and right common iliac artery, the aorta, the inferior vena cava, iliac veins and can lead to the formation of arteriovenous fistulae[5]. Therefore, this kind of injury can manifest itself in various ways, e.g. a fall in blood pressure, an increase in heart rate or decrease in end-tidal CO₂[5, 6, 7]. The intraabdominal injuries observed in the course of lumbar discectomy also include visceral and ureteral trauma[6]. Surgeries at the L4-L5 and L5-S1 levels are predominantly associated with the injuries to the right and left common iliac arteries[2, 6], as in this case.

Usually these vascular injuries manifest only on examination to assess the extent of bleeding and to localize it[1, 2]. Moreover, it becomes clear whether active bleeding is still present. Many studies have shown that only 60% of patients with major vascular injuries develop bleedings into the operative field [2]. Due to prone positioning there is a tamponade effect. On these major vascular injuries and they manifest later[1]. It is essential to detect these injuries very early as late detection can be deleterious to the patients. The anaesthesiologist has to be aware of the serious nature of this complication and has to be vigilant. If vascular damage is suspected, angioCT is a first-in sudden unexplainable hemodynamic instability but in this case there was also abdominal distension which prompted us to proceed with laparotomy immediately, resulting in a better outcome.

The risk factors for such damage include previous disc operations, intraabdominal interventions, or vertebral anomalies [6]. In this case the aggressive technique of disc removal may have led to the complication.

The previous studies demonstrated that surgical exploration allowed to control bleeding from a traumatized vessel and to evacuate haematoma[2, 6]. There are many techniques of vascular damage repair. Depending on the character of injury, primary suturing, interposition grafting, excision with end-to-end anastomosis, suturing from within the vessel, patch angioplasty and ligation are recommended [6].

Recent advances in endovascular techniques open up new possibilities of less invasive management such as emergency endovascular coil occlusion of an injured vessel has been successfully applied[1]. In pseudoaneurysms and arteriovenous fistulae, stenting, with or without coil embolization, has also been performed [8, 9].



CONCLUSION

In conclusion, vascular damage that occurs during lumbar disc surgery should be immediately recognized and treated. The present study indicates that early detection and repair of the injury can result in a favourable outcome.

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