Injury to major vessels is the second leading cause of mortality due to laparoscopy (6.4–10.8%).

Pneumoperitoneum, position of the patient, prolonged surgical time, injury to the intestine or vessels and difficulties in predicting blood loss are common problems for the anesthesia management of the laparoscopic procedures.

Therefore, beside the experience of surgical team, working with an anesthesia team that is experienced in laparoscopic surgeries is essential for lower morbidity and mortality rates.
CASE REPORT

A 14-year-old male patient weighing 70 kg with right non-palpable testis was consulted to anesthesiology department for elective laparoscopic exploration and orchiectomy. Abdominal ultrasound (US) showed positioning of the right testis at the right lower quadrant of the abdomen. Past medical history indicated special education for autism. Upon normal physical and laboratory findings, the patient was accepted as ASA II, and written consent was obtained for general anesthesia. Prior to operating room, midazolam 0.1 mg kg⁻¹ iv (Zolamid®; Defarma, Turkey) was administered as pre-medication. In operating room, electrocardiogram, non-invasive blood pressure (BP), peripheral oxygen saturation (SpO₂), end-tidal CO₂ pressure (ETCO₂) monitoring were performed. For anesthesia induction, propofol 2 mg kg⁻¹ (Propofol 1% Fresenius®; Fresenius Kabi, Sweden), fentanyl 1 µg kg⁻¹ (Talinat®; Vem, Turkey) and rocuronium bromide 0.5 mg kg⁻¹ iv bolus (Esmeron®, Organon, Turkey) were administered.

Tramadol 1 mg kg⁻¹ iv (Tradolex®, Keymen Ilac, Ankara) was applied for pre-emptive analgesia. Maintenance of the anesthesia consisted of 2% sevoflurane within O₂–medical air (50-50%). Gastric drainage was provided by orogastric tube. Surgical team inserted the urinary catheter. The patient was draped in accordance with surgical sterilization principles.

A 10 mm pyramidal trocar was advanced to peritoneal cavity from umbilical area by open trocar entry technique. After pneumoperitoneum was established, the abdomen was penetrated by two 5 mm-trocars. Simultaneously, decrease more than 50% percentage in blood pressure was observed and this was reported to surgical team.

The case’s input blood pressure was 110/70, while the follow-up values were 105/40 mmHg, 95/40 mmHg, 65/35 mmHg, 50/30 mmHg and heart rate (HR) was measured as 84 / min while the following values were measured as 96/min, 102/min, 112/min, 128/min, 152/min. Firstly, the maintenance fluid dose was increased to 20 ml / kg. At this time, ETCO₂ value of the patient was 36 mmHg and SpO₂ value was 96%. Observation of accelerated blood accumulation in peritoneal cavity and hemodynamic deterioration led us to make the decision of emergent laparotomy. The abdomen was penetrated by median incision. The intestines and the mesentery were observed to be intact. The bleeding site was detected to be abdominal aorta at retroperitoneum. Bleeding was controlled by Satinsky clamp, and the aorta was repaired with 3/0 prolene suture. A surgeon was assigned to prepare blood products and transfer blood tests. An anesthesiologist and an anesthesia technician were called for assistance. Two-way central venous catheter of 7F was inserted into the right internal jugular vein. Invasive arterial pressure was monitored via radial artery cannulation. Arterial blood gases and complete blood count were ordered. Hemoglobin was 7.1 g dL⁻¹ and hematocrit was 21.4% (preoperative values were 12.5 g dL⁻¹ and 39.6%, respectively). Intraoperatively, 1500 cc 0.9% NaCl, 1000 cc Ringer lactate, 1000 cc colloidal solution, and 2 units of erythrocyte suspension were administered in total. After follow-up and treatment of 135 minutes at the operating table the case was stabilized hemodynamic and respiratory parameters with Hb 10.4 g/dL, Htc 32.7% values, the case was extubated and transferred to pediatric surgery intensive care unit. There was no decrease in postoperative Hb values and hemodynamic data was stable. On the third day of the surgery, oral feeding started with diet 1 and on the fourth day of the surgery drained. On the seventh day of the surgery oral feeding passed as diet 3. He was further followed at surgical intensive care for 10 days and discharged with full recovery on postoperative day 15.

DISCUSSION

Although vascular injury is not a frequent phenomenon in urological laparoscopic practice (1.6-4.6%), it is the most common reason for switching to open surgery and most commonly reported complication of the procedure.³

Vessel injuries were usually reported during first closed trocar entry or insertion of Veress needle.⁴ Some studies found open laparoscopic entry
technique safer than closed techniques in terms of vascular injuries.\(^5\)

In our case, an open laparoscopic insertion technique was used, yet abdominal wall was not sufficiently lifted to insert pyramidal trocar, after which injury to abdominal aorta occurred.

It is essential in laparoscopic surgery to have adequate and necessary training and experience and to apply appropriate techniques for minimizing complication rates. Should complication occur, the most important factor to reduce mortality is early recognition.\(^6\) When sudden hypotension develops during laparoscopic procedure, CO\(_2\) embolism, compression on inferior vena cava, or vascular injury should be suspected, immediately followed by informing the surgeon and cessation of CO\(_2\) insufflation.\(^6\) Since hypotension occurred before initiating CO\(_2\) insufflation in our patient, embolism and compression onto inferior vena cava were excluded, and the surgical team was alerted in favor of major vessel injury.

Nezhat et al. reported delayed cases of vascular injuries to have increased mortality.\(^7\) Due to limited visualization of laparoscopic images, clinically important intraoperative bleeding events may be missed. Therefore, hemodynamic follow-up and evaluation is very critical. Major vessel injury should be suspected in cases with suddenly deteriorating hemodynamics, and all teams and equipment should be immediately organized and ready for rapid administration of fluid and blood products.\(^6\) Sudden impairment in hemodynamics of our case was shared with surgical team, followed by rapid organization of another team to provide appropriate fluid and blood products as well as delivery of blood tests and access to central venous line.

Most important determinant of complications in laparoscopic surgery was reported to be surgeon’s experience. While the complication rate of the surgeons with experience of <20 cases was shown to be 8.3% that of those having experiences of >100 cases was 2.8%.\(^9\) In order to diminish complication rates in transperitoneal interventions, insertion of oro/nasogastric tube is recommended to decompress the stomach.

Vascular surgeons reported the most rapid and best approach for emergent laparotomy as the median laparotomy.\(^10\) In our case, sudden drop in arterial blood pressure and inspection of the paleness of the patient were alerting, which accelerated the switch to the laparotomy.

In conclusion, sudden deterioration of hemodynamic parameters during laparoscopic orchietomy should prompt for major vessel injury. Open surgery should be immediately performed for rapid bleeding control. In laparoscopic surgery, coordinating with the anesthesia team that has adequate experience of laparoscopy beside that of surgical team is essential for on time intervention to resolve complications. During laparoscopic surgery with less experienced surgeons, care and orientation of the anesthesia team reduce morbidity and mortality.

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