

Pneumothorax - A Rare Complication Of Laparoscopic Total Extraperitoneal Hernia Repair.

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Abstract

Introduction: A 45 year old male patient undergoing bilateral Total extraperitoneal inguinal hernia repair developed hypotension with a fall in oxygen saturation about 20 minutes into the procedure. He was diagnosed to have right sided pneumothorax which was treated with an intercostal drainage tube. The patient had no surgical emphysema or pneumoperitoneum. Patient had an uneventful recovery.

Keywords: Pneumothorax, total extraperitoneal repair.

Introduction

Laparoscopic inguinal hernia repair is being performed with increasing frequency. Decreased postoperative patient pain and quicker return to normal activity are potential advantages associated with laparoscopic hernia repair. Also, TEP repair is being preferred to the transabdominal preperitoneal (TAPP) repair. (1,2)

Pneumothorax, pneumomediastinum and subcutaneous emphysema are unexpected complications of extraperitoneal hernia repair. Longer duration of the procedure with high preperitoneal insufflations pressures have been proposed to be the possible causes of the complication.

Case Report

A 45 year old male with bilateral inguinal hernia with no comorbid conditions was admitted for laparoscopic extraperitoneal repair. Patient had an uneventful intubation with 8.5F endotracheal tube with equal air entry on both sides. In supine position with Trendelenburg's position, the extraperitoneal space was accessed with an open technique with 10mm port in sub-umbilical area. The CO₂ pressure was kept at 12 mmHg and the flow rate was kept at 3 lit/min. Another 5mm port was placed in the midline and space was created on the right side and 5mm port was placed in right lumbar region. Patient had hypotension of 88 mmHg systolic with normal eTCO₂ and increased ventilator peak airway pressure. SaO₂% dropped to 88%. On auscultation, there was no air entry on the right side. A needle

thoracostomy was done with a gush of air. Patient was hyperventilated without nitrous oxide, and the vitals of the patient improved with SaO₂% to 100%. Diagnosis of pneumothorax was made and intercostal tube was placed in 5th intercostal space. The procedure was completed after lowering the CO₂ pressure to 10 mmHg in next 25 mins. There was no major bleeding or peritoneal breach or surgical emphysema noted on abdominal or the chest wall. Post procedure, patient was extubated, however was observed in intensive care unit for 8 hours.

The intercostal drainage had no air leak in postoperative period and was removed on day 2 and patient was discharged on day 3.

An immediate post op chest X-ray had showed a small (<1cm) pneumothorax and no pneumoperitoneum which was consistent with no peritoneal breach during the surgery.

Discussion

Laparoscopic TEP repair is a favoured procedure for bilateral and recurrent inguinal hernias due to low recurrence rate, a reduced risk of intra-abdominal infection or contamination, and damage to the intra-abdominal organs and adhesions, as compared with laparoscopic transabdominal preperitoneal hernia repair or an open procedure. It also causes less postoperative pain with early return to activity. (1,2)

Common intraoperative complications of TEP include surgical emphysema, pneumoperitoneum, pneumoscrotum. In general anaesthesia, patients can develop pneumothorax due to barotrauma or ruptured emphysematous bullae or injury to the trachea or any central

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line procedures and should be ruled out. Pneumothorax though reported, is a rare complication encountered during TEP as the CO₂ insufflation is limited only to the extraperitoneal space (3-7).

Though the dissection is in the extraperitoneal space, various theories have been proposed. Ferzli et al have suggested the entry of CO₂ from the retroperitoneal space to pleural space and the neck, which can lead to pneumothorax and surgical emphysema in the neck (3). Shim et al have reported pneumothorax during retroperitoneal nephrectomy with high CO₂ pressures of 15 mmHg (8). However in our patient, the pressure was maintained to 12 mmHg with flow rate of 3 lit/min. CO₂ traversing the congenital diaphragmatic defects or along the aortic or esophageal defects or Bochdaleck's foramen after an accidental peritoneal breach has been proposed by Browne et al (5), however our patient did not have any pneumoperitoneum.

Pneumothorax is usually diagnosed with respiratory distress and breathlessness which is difficult to diagnose in an intubated patient. However, sudden tachycardia, hypotension, hypercapnia with increased ventilatory pressure and decreased air entry on the side may be helpful in diagnosing pneumothorax intraoperatively.

Intercostal drainage is not mandatory, but a safer approach since, if the vitals are stable, the CO₂ gets diffused within 60 minutes from the tissues. With suspicion of the diagnosis, the CO₂ insufflation should be stopped. The nitrous oxide ventilation should be discontinued with hyperventilation. If vitals are maintained the procedure may be continued with decreased CO₂ pressures of 10 mmHg. Most of the patients may not require postoperative ventilation, however Joris et al have suggested elective ventilation with elevated positive end expiratory pressure for intraoperative pneumothorax than a tube

thoracostomy (9).

The actual incidence of this complication is unknown because postoperative chest radiographs are not and should not be routine after any type of hernia repair. In the situation in which an asymptomatic patient is found to have a pneumothorax, deviation from routine postoperative care is not necessary. However in the symptomatic patient, observation and appropriate monitoring is strongly recommended.

Once the condition is diagnosed intraoperatively, CO₂ insufflation should be stopped or reduced. Nitric oxide should be discontinued and hyperventilation should be performed. Placement of an intercostals drainage tube is not necessary unless the patient becomes hemodynamically unstable or if the respiration is compromised (10). Otherwise careful monitoring is all that is necessary. CO₂ is spontaneously lost in most cases in 30 to 60 minutes following the release of the gas (11).

Conclusion

Pneumothorax is a rare complication of laparoscopic TEP repair, which potentially prolongs hospital stay and thereby increases total costs. The incidence of this complication is only going to increase in the future. Shorter operative duration and lower (10 mmHg) insufflations pressure can help prevent this. We should be aware of this complication to recognize it early in case of an unexplained hemodynamic and respiratory collapse during the surgery. Prompt diagnosis and suitable management can prevent any serious problems.

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