

Jinekolojik Laparoskopik Cerrahi Sırasında Masif Cilt Altı Amfizem**Massive Subcutaneous Emphysema During Laparoscopic Gynecologic Surgery**¹Ayca Sultan SAHİN, ¹Mahmut Boray ALTUNAY¹Department of Anesthesiology and Reanimation, SBU Kanuni Sultan Suleyman Education and Training Hospital, Istanbul, Turkey.Mahmut Boray Altunay: <https://orcid.org/0000-0002-9494-2255>Ayca Sultan Sahin: <https://orcid.org/0000-0002-7765-5297>**ÖZ**

Masif deri altı amfizemi laparoskopik cerrahide nadir görülen bir komplikasyondur. Laparoskopik cerrahide, pnömoperitonum sırasında insüflasyon, pnömotoraks, pnömomediastinumun pnömoperitonum sırasında preperitoneal alana kadar olan komplikasyonlar bildirilmiştir. Otuz iki yaşında, Vücut Kitle İndeksi (VKİ) 26.2 kg/m² olan kadın hastaya sağ over kisti nedeniyle laparoskopik kistektomi yapıldı. Hastanın son tidal karbondioksit (CO₂) değerleri (ETCO₂: 49 mmHg), CO₂ insüflasyonuna (P: 15 mmHg) başladıktan 20 dakika sonra artmaya başladı. Yüz, göz kapakları ve boyunda subkutan amfizem tespit edildi, PaCO₂ 59 mmHg olarak ölçüldü. Pozitif basınçlı ventilasyondan sonra hasta ekstübe edildi. Göz kapağı da dahil olmak üzere yüz bölgesindeki amfizemi, hastada amfizem tespit edildikten 12 saat sonra tamamen geriledi. Uzun süren laparoskopik cerrahiler, CO₂ gazı basıncının ≥ 15 mmHg olması, 6 veya daha fazla trokar girişinin varlığı ve artan yaşla beraber ciltaltı direnci azalır ve amfizeme sebep olur. Bu olguda, laparoskopik cerrahilerde masif ciltaltı amfizemin oluşabileceğini vurgulamak istedik.

Anahtar Kelimeler: Jinekolojik, laparoskopik, subkutan amfizem

ABSTRACT

Massive subcutaneous emphysema is a rare complication in laparoscopic surgery. Complications such as insufflation, pneumothorax, pneumomediastinum to the preperitoneal area during pneumoperitoneum have also been reported in laparoscopic surgery. A 32-year-old, Body Mass Index (BMI) 26.2 kg/m², woman was admitted for laparoscopic cystectomy because of right ovarian cyst. The end-tidal carbon dioxide values of the patient started to increase (end-tidalCO₂:49mmHg) 20 minutes after starting CO₂ insufflation (P:15mmHg). Subcutaneous emphysema was detected in face and neck, eyelids and PaCO₂ was measured 59mmHg. Patient was extubated after positive pressure ventilation. Emphysema in the face area including the eyelid continued in the 12th hour of the patient's emphysema completely regressed. Prolonged surgery, CO₂ gas insufflation pressure ≥ 15 mmHg, 6 or more trocar access, older age may reduce subcutaneous resistance and causes emphysema. In this case, we would like to highlight to massive subcutaneous emphysema in laparoscopic surgeries.

Keywords: Gynecologic, laparoscopic, subcutaneous emphysema

Sorumlu Yazar / Corresponding Author:

Ayca Sultan Sahin
Turgut Ozal St, No:1, Halkalı, 34034, Kucukcekmece, Istanbul
Telephone: +90 505 398 04 19
Fax: +90 0212 5714790
E-mail: aycasultan@gmail.com

Yayın Bilgisi / Article Info:

Gönderi Tarihi/ Received:10/07/2019
Kabul Tarihi/ Accepted: 02/06/2020
Online Yayın Tarihi/ Published: 30/06/2020

Atf/ Cited: Sahin AS, Altunay MB. Massive Subcutaneous Emphysema During Laparoscopic Gynecologic Surgery. Online Türk Sağlık Bilimleri Dergisi 2020;5(2):400-405. doi: 10.26453/otjhs.590326

INTRODUCTION

Laparoscopic gynecologic surgery is one of the most performed surgery in the management of care in gynecological conditions.¹ Although the complications are usually minor and patients may return to

their usual activities in a day or 2, severe and serious complications such as massive subcutaneous emphysema can arise, necessitating the intervention of the gynecologist resulting in prolonged hospital stay and cost of care.²

The clinical setting is very variable, ranging from mild complaints to life-threatening sudden respiratory distress syndrome. Complications such as insufflation, pneumothorax, pneumomediastinum to the preperitoneal area during pneumoperitoneum have been reported in laparoscopic surgery. Massive subcutaneous emphysema is a rare complication in laparoscopic surgery.³ Longer operative times, higher maximum measured end-tidal CO₂ (ETCO₂), greater number of surgical ports and older patient age are all give predispositions to the patients for hypercarbia-related complications during laparoscopy, like subcutaneous emphysema.⁴ We present a case of a 32-year-old female who developed massive subcutaneous emphysema following laparoscopic oophorectomy for ovarian cyst.

CASE REPORT

Informed consent form was obtained from the patient and permission was obtained from the patient for use of the photographs. Copyright regulations were applied for used ideas and works. A 32-year-old woman, Body Mass Index (BMI) 26.2 kg/m² (161 cm and 68 kg), ASA I, Mallampati II, was admitted to the operating room for laparoscopic cystectomy because of right ovarian cyst. She was given routine anesthesia induction with propofol (3 mg/kg), fentanyl (1 µg/kg) and rocuronium (0.5 mg/kg) and Sevoflurane was used for the maintenance. After the intubation patient was taken into Trendelenburg position. The end-tidal carbon dioxide values of the patient started to increase (end-tidalCO₂:49mmHg) 20 minutes after starting CO₂ insufflation (P:15 mmHg) ([Figure1](#)). Subcutaneous emphysema was detected in face and neck. Subcutaneous emphysema was detected in the patient's eyelids at 35 minutes of insufflation and PaCO₂ was 59 (arterial blood gas values: PO₂:93.5, PCO₂:59, PH:7.44, BE:-6.5) and subcutaneous emphysema did not regress, so it was continued with laparotomy. Before the laparotomy insufflation pressure was 22 mmHg. The mechanical ventilator settings when ETCO₂ was 59: Tidal volume was 480 cc, respiratory rate was 13/min and PEEP was 5. In peroperative stage, 1500 cc of isotonic solution was given. Patient was extubated after positive pressure ventilation. The operation took 3 hours. Emphysema in the face area including the eyelid ([Figure 2](#)) continued in the 12th hour of the patient's emphysema completely regressed ([Figure 3](#)) and X-Ray was normal.

DISCUSSION AND CONCLUSION

Laparoscopic surgery is widely practiced all over the world due to its many benefits as compared to conventional laparotomy.⁵ Though laparoscopy is more expensive than similar procedures performed by open technique it has overall positive economic benefits.⁵ In order to provide image and surgical convenience in laparoscopic surgery, artificial pneumoperitoneum is formed by removing the abdominal wall from the organs. Embryological residues occurred channels between the peritoneal cavity, the pleura and the pericardial sac. These channels can be opened during CO₂ insufflation. Crepitation by palpation is felt as the gas dissipates between the tissues. The severity of emphysema is determined by a 4-point scale: (0) no subcutaneous emphysema, (1) mild emphysema with crepitation at trocar entrance site, (2) mild emphysema with crepitation into the abdomen and thigh, (3) massive emphysema spreading into the chest, neck and face.⁶ Prolonged surgery, CO₂ gas insufflation pressure ≥15 mm Hg, 6 or more trocar access, older age may reduce subcutaneous resistance and causes emphysema.⁴ However it could occur in younger ages thus our patient aged 32 years old and we would like to highlight the massive subcutaneous emphysema could occur in these ages.

In order to prevent massive subcutaneous emphysema during laparoscopic surgery following precautions have been recommended to be taken into account; CO₂ insufflation pressure should be monitored and kept below 12 mmHg, in order to prevent subcutaneous gas accumulation palpate abdomen and chest wall frequently, if surgical emphysema is suspected discontinue N₂O, ventilation should be at an acceptable EtCO₂ level, if EtCO₂ rises, the possibility of pathologies such as subcutaneous emphysema and acute hypercarbia should be kept in mind and laparoscopic procedure may have to be converted to open surgery.⁷ When cervicofacial emphysema occurs during laparoscopic procedures, laryngoscopy should be performed before tracheal extubation in order to avoid potential airway obstruction from potential associated pharyngeal emphysema.⁸

In a case report, extravasation of carbon dioxide at the beginning of the diagnostic laparoscopy resulted in pneumomediastinum, pneumothorax, and ocular emphysema. They suggested that it was assumed that the intraperitoneal carbon dioxide traversed into the mediastinum via a defect in the diaphragm which resolved after abdominal deflation.⁹

In a review, laparoscopic abdominal surgeries should be performed under standard pressure (12

mmHg to 16 mmHg) pneumoperitoneum with cold gas insufflation.¹⁰ We suggested that in laparoscopic surgery, lower pressures are claimed to be safe and effective in decreasing cardiopulmonary complications, pain and especially pneumomediastinum and emphysema.

Ethics Committee Approval: The permission was obtained from the patient for this study. There was no need for the Ethics Committee's Approval.

Conflict of Interest: No conflict of interest was declared by the author.

Author Contributions: Concept – ASS ; Supervision ASS; Materials –MBA; Data Collection and Processing – MBA, ASS; Analysis and Interpretation – ASS, BA; Writing – ASS, MBA.

Peer-review: Externally peer-reviewed.

repair complicated by subcutaneous emphysema. *Can J Anaesth.* 1995;42:523–25.

8. Yagihashi Y, Okinami T, Fukuzawa S. Case of pharyngeal emphysema with airway obstruction during retroperitoneal laparoscopic nephroureterectomy. *Nihon Hinyokika Gakkai Zasshi.* 2009;100:540–544.
9. Suresh YV., Suresh YA, Sequeira TF. Laparoscopy-Pneumothorax and Ocular Emphysema, A Rare Complication-A Case Report. *Journal of Clinical and Diagnostic Research.* 2014;8:1-2.
10. Yu T, Cheng Y, Wang X, et al. Gases for establishing pneumoperitoneum during laparoscopic abdominal surgery. *Cochrane Database of Systematic Reviews.* 2017;6:CD009569.

REFERENCES

1. Whiteman MK, Hillis SD, Jamieson DJ, et al. Inpatient hysterectomy surveillance in the United States, 2000–2004. *Am J Obstet Gynecol.* 2008;198:34.1-7.
2. Fuentes MN, Rodríguez-Oliver A, Naveiro Rilo JC, et al. Complications of laparoscopic gynecologic surgery. *JLS.* 2014;18(3):e2014.00058. doi:10.4293/JLS.2014.00058
3. Baron PW, Ben-Youssef R, Ojogho ON, et al. Morbidity of 200 consecutive cases of hand-assisted laparoscopic living donor nephrectomies: A single-center experience. *J Transplant.* 2012;2012:121523. doi:10.1155/2012/121523
4. Murdock CM, Wolff AJ, Geem TV. Risk factors for hypercarbia, subcutaneous emphysema, pneumothorax and pneumomediastinum during laparoscopy. *Obstet Gynecol.* 2000;95(5):704–9.
5. Worrel J, Cleary D. Massive subcutaneous emphysema and hypercarbia: complications of CO₂ absorption during extraperitoneal and intraperitoneal laparoscopic surgery – case studies. *AANA J.* 2002;70:456–461.
6. Sumpf E, Crozier A, Ahrens D, et al. Carbon dioxide absorption during extra peritoneal and trans peritoneal endoscopic hernioplasty. *Anesth Analg.* 2000;91:589-95.
7. Klopfenstein CE, Gaggero G, Mamie C, et al. Laparoscopic extraperitoneal inguinal hernia



Figure 1. Perioperative Massive Subcutaneous Emphysema.



Figure 2. Subcutaneous Emphysema during Extubation.



Figure 3. Normal view of face on postoperative 12th hour.