



Bilateral pneumothorax after breast augmentation surgery: it does not happen or it is not sought? Consideration of a case report

Giorgio Lo Iacono¹, Federica Danuzzo¹, Ludovic Fournel², Antonio Mazzella¹, Marco Alifano²

¹Department of Thoracic Surgery, IEO, European Institute of Oncology IRCCS, Via Giuseppe Ripamonti, Milan, Italy; ²Service de Chirurgie Thoracique, Hôpital Cochin, Université de Paris, Paris, France

Contributions: (I) Conception and design: G Lo Iacono, L Fournel; (II) Administrative support: A Mazzella, F Danuzzo; (III) Provision of study materials or patients: G Lo Iacono, L Fournel; (IV) Collection and assembly of data: F Danuzzo, A Mazzella; (V) Data analysis and interpretation: L Fournel; (VI) Manuscript writing: All authors; (VII) Final approval of manuscript: All authors.

Correspondence to: Giorgio Lo Iacono, MD. IEO, European Institute of Oncology IRCCS, Via Giuseppe Ripamonti, 435 Milan, Italy. Email: giorgio.loiacono@ieo.it.

Background: Breast augmentation is one of the most popular cosmetic surgeries and its low complication rate makes it one of the safest procedures. There are a few, but not negligible, cases of pneumothorax that can present as a major complication of surgery, but they are usually asymptomatic and do not require emergency treatment, as happened in this unique case.

Case Description: We describe the case of a young woman without comorbidities who developed a progressive acute respiratory failure due to bilateral pneumothorax on the night of the cosmetic surgery requiring orotracheal intubation. After the placement of bilateral pleural drainage, with improvement of the clinical picture, the patient subsequently underwent pleurodesis surgery for safety reasons. Then she recovered completely without any further complications. Although the pathophysiological mechanism is not yet clear, there are several theories supporting the development of pneumothorax during surgery.

Conclusions: It is advisable to put into practice all the precautions for respecting the integrity of the chest wall and to foresee all the measures to manage the complication in the operating room and in the ward, even in small private setting at least for emergencies.

Keywords: Breast augmentation; thoracoscopy; bilateral pneumothorax; case report

Received: 12 October 2022; Accepted: 20 November 2022; Published: 30 December 2022.

doi: 10.21037/amj-22-93

View this article at: <https://dx.doi.org/10.21037/amj-22-93>

Introduction

Aesthetic breast surgery is widely performed by plastic surgeons across the world since first Czerny's procedure in 1895. Mammoplasty for breast augmentation has become one of the most common performed procedure in the field of cosmetic surgery through the years (1,2). Seroma, hematoma, infection and extrusion are reported as early most frequent complications; late complications include capsular contracture, rupture or rotation of the implant and breast asymmetry (3,4). Pneumothorax has been described after breast augmentation surgery and it seems to be one of the rarest and poorly understood complications reported in

literature. It can often be a distressing event and a medical emergency potentially life-threatening. More rarely has been reported bilateral pneumothorax, but never before has such a serious event occurred, as described below. In this article we report the case of iatrogenic complete bilateral pneumothorax following breast augmentation surgery. Medical conditions required emergency intubation, mechanic ventilation and placement of two chest tubes. Successively patient underwent video-thoracoscopy for pleurodesis to secure at least one of the two sides. We present the following case in accordance with the CARE reporting checklist (available at <https://amj.amegroups.com/article/view/10.21037/amj-22-93/rc>).

Case presentation

A 42-year-old non-smoker active woman underwent bilateral breast augmentation in a private clinic as cosmetic surgery. Her medical history was positive for protein C deficiency and mutation of factor V Leiden with no signs of deep vein thrombosis; no previous surgical history. Anaesthesia was induced with propofol and sufentanyl. Atropine and Cefazolin were administered as prophylaxis. Surgery was uneventfully, consisting of a retropectoral augmentation of two anatomical breast implants. During the night patient complained progressive shortness of breath and multiple episodes of vomit not controlled with the administration of ondansetron and metoclopramide. A strong analgesic therapy was applied with paracetamol, dexamethasone, ketoprofen and tramadol. Early in the morning patient's conditions worsened. A severe respiratory distress developed, decrease of oxygen saturation to 70% on room air and presence of bilateral wheezing. Asthma attack or kind of bronchospasm was suspected even though the patient had no history of asthma. No improvement was observed after administration through aerosol of beta-2-agonist and methylprednisolone: the patient presented tirage and was incapable of speaking. Blood pressure was 140/80 mmHg, heart rate was rhythmic at 80 bpm and oxygen saturation was 90% with 15 L/min; arterial blood gases showed pH 7.14, pCO₂ 114 mmHg, pO₂ 79 mmHg, HCO₃⁻ of 25 mmol/L. Intubation was mandatory and hypotension after sedation responded to injection of crystalloids: then she was transferred to the ICU of our hospital. The patient was intubated and sedated, rhythmic heart rate, oxygen saturation of 96% FIO₂ 100%; there was jugular distension venous and both lungs presented decrease of vesicular murmur and bilateral wheezing. A chest X-ray demonstrated complete bilateral pneumothorax (*Figure 1*). Two chest tubes were rapidly inserted in both thoracic cavities (*Figure 2*) and general conditions quickly improved: arterial blood gases post tube insertion showed pH 7.19, pCO₂ 54 mmHg, pO₂ 326 mmHg, HCO₃⁻ 20 mmol/L. Extubation was reached uneventfully and thoracic surgery advice was required. A thoracic CT scan showed a bilateral slight apical pneumothorax, more represented on the left side, associated with subpleural consolidations. No evidence of emphysematous lung disease or bullous dystrophy was found. The patient was transferred to the thoracic surgery department: left pleural drainage still showed air leaks, so a video-thoracoscopy



Figure 1 Bilateral pneumothorax in patient with orotracheal intubation in emergency area.

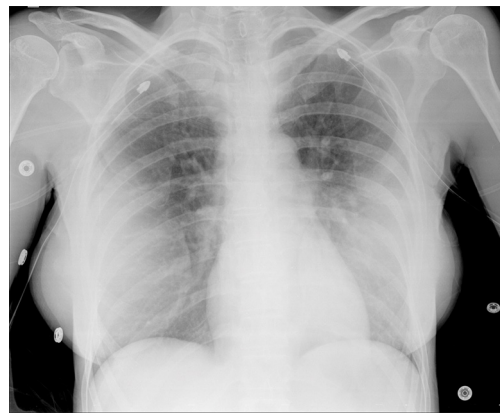


Figure 2 Double pleural drainage with complete lung re-expansion.

surgery for pleurodesis on the left side was planned. Under general anaesthesia a double lumen tube was inserted. We proceeded for a thoracoscopic wedge resection of the lung apex with stapler multiple charges. Pleural cavity inspection was negative, except for some reddish membranes founded at diaphragm level sampled for further histological investigations. Talcum powder was then instilled in the thoracic cavity, sprinkled on the parietal pleura in order to allow complete adhesion of the lung once fully expanded. A thoracic drain (24 Fr) was placed. Histological examination revealed presence of moderate bullate dystrophy in lung parenchyma and no sign of endometriosis. Post-operative period was uneventful: right chest drain was removed after 4 days (1st POD) from placement and left one on 3rd POD. Subsequent chest radiography confirmed complete re-

expansion of both lungs and patient was discharged after 7 days without any further complications. The patient had a complete recovery, without any complications or subsequent adverse events related to the problem treated.

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Helsinki Declaration (as revised in 2013). Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the editorial office of this journal.

Discussion

Pneumothorax is a quite common pathology in thoracic surgery. It can be classified in three types: spontaneous and further primary or secondary related to pre-existing conditions, such as heavy smoking, bullae and blebs or pulmonary diseases such as emphysema, malignancy, thoracic endometriosis. Pneumothorax can also be traumatic (caused by blunt or penetrating traumas) or iatrogenic as a result of direct puncture or laceration of the visceral pleura, transbronchial lung disruption, alveolar overdistension (1,3-5).

Tension pneumothorax occurs when a parenchymal or bronchial injury determines a one-way valve allowing air to enter the pleural space but not exit. It represents an emergency situation of hemodynamic instability due to low preload (as venous return is compromised by the compression of the vena cava, right atrium, or large veins) and decreased cardiac output. Since it can be potentially life-threatening, in these cases a prompt treatment is required with needle decompression and chest tube insertion (2,5). Patients with pneumothorax can present with respiratory thoracic pain, severe growing dyspnea, cyanosis, tachycardia and subcutaneous emphysema; the pulmonary auscultation can be normal or diminished on the affected side (1). Chest radiography shows collapsed lung and a bilateral deep sulcus sign with depression of both diaphragms can also be detected in tension pneumothoraces (2). The treatment depends on the extent of the pleural detachment and on clinical state: for minimal pneumothorax simple observation and oxygen are helpful. On the other hand, massive pneumothoraces may require chest tube insertion and aspiration (1). Indications for surgery are a second episode of pneumothorax (ipsilateral or contralateral

recurrence) or at time of the first episode in case of persistent air leak, hemothorax, failure of the lung re-expansion, bilateralism, tension pneumothorax, complete pneumothorax, professional occupations presenting high recurrence risk (sailors, airline or military pilots, divers, trumpeters). Pneumothorax as breast surgery complication has been described in literature related to different aetiologies: accidental needle puncture during injection of local anaesthesia, intraoperative laceration of the pleura by dissection or cautery, rupture of pre-existing blebs, high-pressure ventilation (1-5). A survey published in 2005 by Osborn and Stevenson revealed that pneumothorax is a more common complication in breast surgery than is thought. The survey was sent to 363 members of the California Society of Plastic Surgeons with a 50% of response rate: the study revealed one in three members (34%) have experienced at last one case of pneumothorax with no relationship between surgeon's experience and incidence of pneumothorax. Most surgeons (43%) reported unexpected intraoperative laceration of pleura as most likely cause of pneumothorax and 37% of them needle puncture during local injection. The survey indicated that pneumothorax occurred in patients under general, local anaesthesia or both and in 24% of the cases no needle injection was used (6). Kaye *et al.* reported a case of iatrogenic tension pneumothorax occurred six hours into breast surgery augmentation. They suspect local anaesthetic infiltration of the breast using a 22-gauge 3.5 inch spinal needle as the most likely cause of pneumothorax in this patient (7). Franco *et al.* suggest to clinically investigate patients undergone breast surgery when presenting even only subcutaneous emphysema, especially when local infiltration has been done (4).

Local barotrauma during implant insertion has been recently suggested as a mechanism of breast augmentation-related pneumothorax. When a large implant is advanced through a small incision, some air is trapped in the surgical sub pectoral pocket under high pressure: this air dissects through chest wall muscles till the pleural cavity causing pneumothorax (8). Fayman *et al.* confirmed this hypothesis by draining the air from surgical pocket during implant insertion: the study showed air drainage reduce or eliminate the incidence of pneumothorax. They further confirmed this hypothesis during an intervention for hysterectomy and abdominoplasty, during which the abdominal wall was infiltrated with local anaesthetic solution. At the incision of the abdominal wall fluid was found in the peritoneal cavity, suggesting the anaesthetic solution injected under pressure,

penetrated through the wall and muscles (8). The limits of this study are mainly related to the singularity of the clinical case, but even more to the limited numbers of cases in general that do not allow to make extensive assessments on the genesis of events, but we believe it is important to increase attention on the potential problems related to a practice as common and widespread as cosmetic breast surgery.

Conclusions

Even if pneumothorax is not a common complication of aesthetic surgery procedures, it should always be suspected and investigated when respiratory symptoms occur after breast surgery. It is a distressing event which and, in the case of a bilateral event, can be potentially fatal. Although the pathophysiological mechanism is not yet clear, there are several theories supporting the development of pneumothorax during surgery. It is advisable to put into practice all the precautions for respecting the integrity of the chest wall and to foresee all the measures to manage the complication in the operating room and in the ward. In our opinion the major part of pneumothorax can have a subclinical course without diagnosis due also to the non-routine use of postoperative chest radiography. Thus, the exact incidence could probably be underestimated due to the relatively young age of patients associated with the good general condition of those who usually undergo cosmetic surgery and their consequent wide cardiorespiratory reserve. Clinical examination, oxygen saturation and chest radiograph should be immediately performed in order to make diagnosis and prompt intervention as a tension pneumothorax requires. Patient undergoing breast surgery should always be informed about risks of pneumothorax as complication. The treatment depends on the extent of the pleural detachment and on clinical state: thoracic surgeons should be always consult in order to perform the most appropriate treatment.

Acknowledgments

Funding: None.

Footnote

Reporting Checklist: The authors have completed the CARE reporting checklist. Available at <https://amj.amegroups.com/article/view/10.21037/amj-22-93/rc>

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at <https://amj.amegroups.com/article/view/10.21037/amj-22-93/coif>). The authors have no other conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Helsinki Declaration (as revised in 2013). Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the editorial office of this journal.

Open Access Statement: This is an Open Access article distributed in accordance with the Creative Commons Attribution-NonCommercial-NoDerivs 4.0 International License (CC BY-NC-ND 4.0), which permits the non-commercial replication and distribution of the article with the strict proviso that no changes or edits are made and the original work is properly cited (including links to both the formal publication through the relevant DOI and the license). See: <https://creativecommons.org/licenses/by-nc-nd/4.0/>.

References

1. Pfulg ME, Favre S, Verdeja R. Bilateral pneumothoraces: a rarely described complication following augmentation mammoplasty. *Aesthet Surg J* 2005;25:49-52.
2. Mavridis S, Gnauk HG, Schumacher M, et al. Bilateral pneumothoraces complicating reduction mammoplasty: a case report. *BMC Surg* 2013;13:29.
3. Senthilkumaran S, Balamurugan N, Menezes RG, et al. Bilateral pneumothorax following breast augmentation: Beware and be aware. *Indian J Plast Surg* 2012;45:579-80.
4. Franco T, Franco D, Treiger N. Subcutaneous emphysema during breast augmentation: case report. *Rev Bras Anesthesiol* 2007;57:414-20.
5. Vera-Merchancano R, Hernández-Palazón J, Fuentes-García D, et al. Intraoperative bilateral tension pneumothorax in a patient undergoing breast augmentation surgery with general anesthesia. *J Plast Reconstr Aesthet Surg* 2014;67:e165-6.
6. Osborn JM, Stevenson TR. Pneumothorax as a complication of breast augmentation. *Plast Reconstr Surg*

- 2005;116:1122-6; discussion 1127-8.
7. Kaye AD, Eaton WM, Jahr JS, et al. Local anesthesia infiltration as a cause of intraoperative tension pneumothorax in a young healthy woman undergoing breast augmentation with general anesthesia. *J Clin Anesth* 1995;7:422-4.
 8. Fayman MS. Air drainage: an essential technique for preventing breast augmentation-related pneumothorax. *Aesthetic Plast Surg* 2007;31:19-22.

doi: 10.21037/amj-22-93

Cite this article as: Lo Iacono G, Danuzzo F, Fournel L, Mazzella A, Alifano M. Bilateral pneumothorax after breast augmentation surgery: it does not happen or it is not sought? Consideration of a case report. *AME Med J* 2022;7:40.