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CASE REPORT

PNEUMOTHORAX AFTER MODIFIED RADICAL MASTECTOMY UNDER GENERAL ANESTHESIA

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ABSTRACT: A 67 yrs old lady who underwent modified Radical mastectomy under General Anesthesia developed pneumothorax in the immediate post-operative period. She was treated with chest tube insertion and was discharged from hospital 8 days later.
KEYWORDS: Pneumothorax, General Anesthesia, mastectomy.

INTRODUCTION: Pneumothorax is a complication that can occur during General Anesthesia, intra or post operatively. It can occur from thoracic damage, or alveolar rupture due to high positive airway pressure. [1,2] It can also occur due to damage of the neck, trachea throat, esophageal wall and the abdominal wall although this is infrequent. Pneumothorax is also reported after breast augmentation surgery. [3,4,5]

Once pneumothorax occurs it leads to thoracic pain, a decline of oxygen saturation, decreased breath sound on auscultation, tachycardia and reduction in blood pressure. If tension Pneumothorax progresses due to positive pressure, the patient can fall into a critical state. So it is important to diagnose and treat Pneumothorax early. There have been many case reports that gas on excessive pressure infused in endoscopic surgery causes Pneumothorax.[6] In this patient preoperative chest x-ray showed fibrotic bands and pleural thickening. So there might have been bullous lesions and rupture of it caused pneumothorax.

CASE REPORT: A 67 years old patient presented with lump in the breast of 5 months duration and her biopsy suggested invasive ductal carcinoma of breast. She was given chemotherapy 6 cycles. She has been on antipsychotic drugs for the last 16 years. Drugs she was on were haloperidol 5 mg at night and trifluoperazine 5mg + trihexyphenidyl 2mg (serentin1 tablet) at night and trihexiphenidyl 2mg tab in the morning daily.

Clinical examination at preanaesthesia clinic was within normal limit. No history of previous lung disease was reported. Blood investigation and ECG were normal.

Chest x-ray showed suspected plural calcifications in left upper zone and right middle zones and fibrotic bands in both lungs.

Upon arrival at the operation room, she was cannulated with an 18 G Intravenous cannula in the left upper limb and 500ml normal saline was started. She was premedicated with injection midazolam 1 mg, ondansetron 4 mg and glycopyrolate 0.2 mg, intravenously. Considering the intake of psychiatric drugs opioid premedication was avoided.

After preoxygenation anesthesia was induced with propofol 100 mg, followed by vecuronium 4 mg. Lignocaine (preservative free) 60 mg given before induction to decrease the pain of propofol injection and to decrease stress response to laryngoscopy. She was intubated with Size 7 cuffed orotracheal tube. Air entry was equal on both sides and tube secured at 21 cm.

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Anesthesia was maintained with nitrous oxide 66%, oxygen 33% and propofol infusion. Supplementation of vecuronium was done 4 times. Paracetamol infusion 1000 mg given for post-operative analgesia. Intraoperative blood pressure remained at a range of 110/70 to 120/80 and pulse rate 96 to 98 /mt., SPO2 remained 100%. Normal saline 2 litres was given. Surgery lasted 3 hrs after which she was reversed with Neostigmine and glycopyrolate. Patient became conscious and respiration seemed adequate. So she was extubated and O2 was given by mask. Throughout the period of surgery mean airway pressure were between 8 to 10 and peak airway pressure went up to 20 cm H2O. ETCO2 was 30 to 35 mmHg.

Within few minutes of extubation chest movement seemed insufficient. There was shallow breathing and SPO2 started falling. Patient became drowsy. So she was reintubated with orotracheal tube no. 7 and inspiration was synchronously assisted. On auscultation air entry on left side was less audible compared to right side. On percussion left side of chest was hyper resonant. SPO2 remained at 92 to 93 % with a FiO2 of 100%.Within seconds she developed surgical emphysema of chest wall and also abdominal wall.

We suspected Pneumothorax and the surgeon attempted needle thoracotomy. Pneumothorax was confirmed and ICD was inserted. Lung was collapsed on left side as felt by surgeon while putting ICD. Chest movement and air entry improved after ICD. SPO2 became 100% patient was shifted to AICU and put on ventilator on SIMV mode.

CXR taken on the same day in AICU showed Pneumothorax left side with ICD in situ and surgical emphysema.

In the AICU patient developed hypotension and so she was on dobutamine infusion.

Next day, she became hemodynamically stable and was weaned off from dobutamine and extubated on the same day.

Chest x-ray showed complete expansion of the lung on 3rd postoperative day. She was shifted to postoperative ward and was discharged from hospital on the 8th day.

DISCUSSION: Mac Intyre [7] divided the causes of Pneumothorax related to General Anesthesia into 4 groups.

GROUP 1: Alveolar rupture causes the air around the sheath near the vessel to flow out of the mediastinum, diffuse into the plural cavity and cause Pneumothorax.

GROUP II: Involves rupture of mediastinal pleura that follows damage to the fascial layer with the mediastinal emphysema.

GROUP III: The peripheral airway and the pleura are connected directly.

TYPE A: Is from the alveolar rupture on the surface of the lung without any damage to the pleura.
TYPE B: Is when chest wall and pleura both have ruptures due to damage of the chest wall. It is also when there is damage to the lung parenchyma.

GROUP IV: Involves damage only to the chest wall. The internal and external part of the thorax is usually punctured. The reported cause for general anesthesia related pneumothorax usually belongs to group 1 and 4. [1,5,6]

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Alveolar ruptures are caused by excessive positive airway pressure. This occurs when pressure increases in the alveoli over a steady period of time rather than in a sudden increase in pressure. In general, if transpulmonary pressure does not go beyond 30 - 35 cm water alveolar rupture almost never occurs.[8]

Additionally as long as tidal volume during mechanical ventilation does not go beyond 10 ml/kg and the plateau pressure does not go beyond 30 - 35 cm water, alveolar rupture almost never occurs.[9] Pepe et al[10] stated that positive end expiratory pressure of the usual positive pressure does not increase the rate of occurrence of pneumothorax. Kirby et al[11] reported that high positive end expiratory pressure above 18 mm Hg increases the rate of occurrence.

Common complications of mastectomy are bleeding, hematoma, infection and lymphoedema. Pneumothorax is very rare after modified radical mastectomy. Though it has been reported after breast augmentation surgery.[3,4]

In this case MRM was done on right side and Pneumothorax occurred on left side. Chest x-ray of this patient showed fibrotic changes so there might have been some bulbous lesion which ruptured post operatively. In spontaneously breathing patients small Pneumothorax can be naturally absorbed and is a minor problem.

However, when intermittent positive pressure ventilation is performed for a patient under general anesthesia the intrapleural pressure suddenly increases and can cause it to develop into tension Pneumothorax. Symptoms of Pneumothorax in general anesthesia are firstly tachycardia and hypotension and then hypercapnoea and hypoxia.

When Pneumothorax progresses, it can lead to cyanosis. When tension Pneumothorax progresses it presses the lung of the same side and results in atelectasis. If Pneumothorax further progresses it causes mediastinum displacement, compression of opposite lung, compression of vena cava, reduces cardiac output and triggers rapid circulation failure.[12] Conscious patients experience tachycardia, dyspnoea, and chest pain which can reduce depending upon the body position. If Pneumothorax further progresses, the patient experiences cyanosis, and severe tachycardia which can lead to loss of consciousness and lung collapse. In spontaneously breathing patients 10-20 % of the progression of Pneumothorax can be absorbed spontaneously.

Beyond 20 % tube thoracostomy must be done. Patients under mechanical ventilation must be immediately inserted with tube thoracostomy regardless of the size of the Pneumothorax.[13] In this patient preoperative chest x-ray showed fibrotic bands and pleural thickening. So there might have been bullous lesions and rupture of it caused pneumothorax.

Pre-operative Chest X-ray

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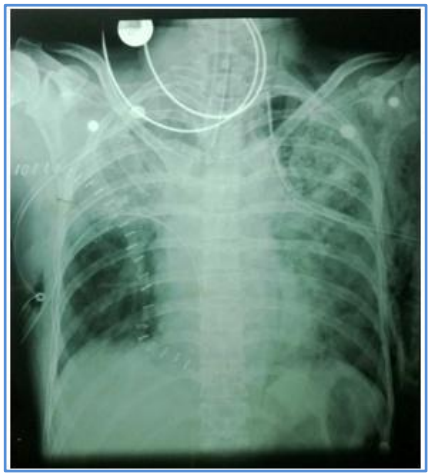

First post-operative day

Second post-operative day

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