Cardiac Herniation Following Pneumonectomy.

Dharamsing Kishanrao Pawar*, Vijay Shortey, Umesh Ramtani *, Shital Namdeorao Mankar*, Sauabh Varshney*

*GMC, Yavatmal, Maharashtra, India

Abstracts: Cardiac herniation is rare. If it is untreated, lead to fatal complications of pneumonectomy. Symptoms are site related. It has sudden onset of hypotension, arrhythmia and cardiac arrest. Clinical suspicion with plain X- ray chest and ECG changes must lead to early diagnosis and require prompt surgical treatment. We present here one such case of cardiac herniation which was developed immediately after shifting the patient to recovery room, diagnosed, treated and saved the patient. [Pawar D NJIRM 2015; 6(2):1]

Key Words: Cardiac herniation, Pneumonectomy, post operative complication.

Author for correspondence: Dharamsing Kishanrao Pawar, Yavatmal. E-mail: vihanpawar13@gmail.com

Introduction: Cardiac herniation occurring after lung surgery was first reported by Bettman[(1)] in 1948. Although this complication is rare, it can be fatal if not recognized in time and if treatment is delayed. To handle this crises all the members of the team should be aware about the early diagnosis and treatment. We present here one case of cardiac herniation which was developed immediately after shifting to recovery room,diagnosed,treated and saved the patient.

Material and Methods:

Case Report: 54 years male patient was admitted in medicine ward with complain of shortness of breath, chest pain, cough, fever with chills,there were no history of tuberculosis and diabetes in past. After confirmation with laboratory investigation and chest X ray it was diagnosed as pleural effusion with bacterial etiology then treated with antibiotics and intercostals drain. But patient fail to improve with close intercostal drain even after several days. To improve patient condition he was refered from medicine to cardiovascular and thoracic surgery department for farther management. In the department thoracotomy and pleural resection decision was taken.

Postoperatively pleural drainage persisted with air leak for one month resulting in collapse of the lung on the affected right side. Then decision of decortications of right lung was taken. At the time of decortications His Heamoglobin, hematocrit, TLC, DLC, KFT, LFT, Coagulation profile and PFT were in acceptable range. On the day of operation he received oral diazepam 10mg. On table basal vitals were noted. Thoracic epidural catheter was introduced under local anaesthesia at T4 level. Left radial artery and Right internal jugular canulation done under local anaesthsia. Inj.Glycopyrrolate 0.2mg, Inj. Midazolam 2mg,Inj.fentanyl 50mcg,were administered IV as premedicants. After Inj.Thiopentone 200mg and Inj.Vecuronium 8mg patient was intubated with left Double lumen tube. Anaesthesia was maintained with Isoflurane,Inj.fentanyl 100 microgram ,Inj.midazolam 5 miligram , and Inj.Vecuronium 20 miligram in infusion 50ml syringe at the rate of 5 ml /hr in syringe pump. Vitals were monitored using ECG, IBP, CVP, SpO2, ETCO2 and urine output. Inj.Fentanyn l50 microgram and Inj.Bupivacaine 0.5% 7ml administered epiduralllly. Intraoperatively decortication was attempted but lung expansion was not satisfactory. After discussion, explaning to relative and informed consent was taken ,intrapericardial pneumonectomy was performed. After checking suture line and bleeder, chest was closed. Adequate crystalloid and blood loss was replaced guided by CVP and blood pressure. Residual paralysis was reversed with Inj.neostigmine 2.5mg and Inj.atropine 1.2 mg IV. Spontaneous breathing was adequate but he was drowsy hence double lumen tube was replaced with single lumen endotracheal tube, left in situ and shifted to recovery room.

In recovery room all cables were reconnected. Vitals were stable, Endotracheal suction done, After 5 minutes ECG showed ST changes followed by fibrillation with flat arterial waveform. External cardiac massage, repeated defibrillation and other resuscitative measures were done but they did not improve the situation. Suction applied to drain bottle was immediately disconnected. Possibility of massive vascular bleeding was ruled out. Change of

position was tried but it did not help. As patient was not responding to the treatment, keeping the possibility of the cardiac herniation kept in mind, chest was opened. Heart was found peeping through the pericardial window and was strangulated. As soon as heart was repositioned arterial wave form appeared, ECG and blood pressure started improving. Pericardial defect was closed using ePTFE(Polytetrafluoroethylene) patch and chest was closed. Further recovery of patient was uneventful and he was discharged on 10th postoperative day.

Discussion : : The first case of cardiac herniation was reported by Bettman et al[1] in 1948. In 1999, Kimura et al[2] reviewed 68 reported cases of cardiac herniation following lung surgery. They reported that cardiac herniation was more frequent on the right side (46cases) than on the left side (22cases) and proved fatal in 12 patients with right herniation and 9 patients with left side herniation.

Symptoms: The symptoms are related to the location of the pericardial defect causing cardiac dislocation. On the right side, kinking or torsion of both SVC and IVC leads to reduction of cardiac filling resulting decrease in systemic blood pressure, rise in central venous pressure and the onset of tachycardia. On the left side, cardiac herniation produces dysarrythmias and myocardial ischemia due to compression or strangulation of the ventricular wall by the pericardial edges, which can lead to hypotension, ventricular fibrillation and infarction[3]

Causes: Most cases of cardiac herniation develope after pneumonectomy. In some cases it has been found after lobectomy[4]. The same has been reported after chest trauma and excision of thymoma. In 75% reported cases of cardiac herniation occurred before the end of the surgery, i.e., during the repositioning of the patient[5]. The lack of reported cases of late herniation(more than 24 hours postoperatively)is probably the result of rapid development of adhesion between the heart and pericardium.[6]

Precipitating Factors: – Factors which can trigger cardiac herniation include coughing, positive pressure ventilation, suction on the chest drain, repositioning the patient with the operated side downwards.[7] A leading factor which triggers cardiac herniation after pneumonectomy is rise in the thoracic pressure due to coughing (reaching over 100mm Hg), which probably pushes the heart towards the side that has been operated upon. It is simple to imagine that in presence of pericardial defect, coughing is likely to elevate the thoracic pressure, which pushes the heart towards the defect, leading to cardiac herniation.

A pericardial incision that has been closed by suturing can open again during coughing, sometimes to the extent that it causes cardiac herniation. In the present case onset of cardiac herniation seemed to be triggered by the following factors:

1. Presence of pericardial defect.
2. Decompression of the thoracic cavity on the operated side due to suction applied to water seal thoracic drain.
3. Elevation of the thoracic pressure due to cough reflex during endotracheal suction.

Treatment: Treatment is directed at immediate replacement of the heart to its normal position and closure of the defect by one of several methods. Although Bettman et al recommended enlarging or excising the pericardium,it has been recognized that this will not prevent cardiac herniation. It is obvious that direct closure of the pericardium may not prevent cardiac herniation. When the pericardium is closed by suturing, it is often sutured loosely to avoid postoperative cardiac tamponade. Since 1970s, patch closure has often been used for the treatment of cardiac herniation. There have been no reports of occurrence of herniation after this treatment. Materials used to fill the pericardial defect include the patient's own tissue (fascia lata,pleaural flaps etc.) and artificial material such as Teflon graft or Polytetrafluoroethylene (ePTFE) patches. Teflon is polyporous material can cause constrictive pericarditis or infection. On other hand because of simplicity and the low risk of infection,ePTFE patches are often used. Use of Vyeryl mesh Gortex has also been suggested.[8,9,10]

Conclusion: High degree of suspicion is required to diagnose the herniation of heart. Timely diagnosis

and prompt surgical intervention is needed to save the patient from this rare and fatal complication.

References:

1. BettmanR.B. TannenaumWJ. Heniation of heart through a pericardial incision,AnnSurg 1948; 128:1012-4
2. Zunzo Shimizu, Yoshinori Ishida. Cardiac Herniation following intrapericardialPneumonectomy with Partilpericardiectomy for advanced Lung Cancer. Ann ThoracCardiaovaseSurg 2003,9:68
3. Cassorla L. Katz J J. Management of /cardiac Herniation after IntrapericardialPneumonectomy. Anesthsiology 1984;60:362-4
4. Ohri SK, Siddiqui A A Townsend E R Cardiac Torsion after Lobectomy with partial pericardectomy Ann ThoreSurg 1992;53:703-5
5. Baaijens P F J, HasenbosMAWM, Laequet L K, Dekhuijzen. Cardiac Herniation after Pneumonectomy. ActaAnaesthesiolScand 1992,36:842-5
6. DeiralyaA K. Cardiac Herniation following IntrapericardialPneumonectomy. Throx 1974; 29: 545-52
7. Self R J Vaughan R S Acute Cardiac Heniation after Radical Pleuropneumonectomy. Anesthesia 1999; 54: 564-6
8. KageyamaY,Suzuki.K.,MatsushitaK,NogimuraH, KazuiT.pericardial closure using facialata in patient undergoing pneumonectomy with pericardiectomy.AnnThoracSurg 1998;66:586-7
9. Neville WE,Jubb ED, Successful treatment of cardiac herniation through a surgical rent in the pericardium.Am.J.Surg 1957,jun93(6):1038-1039
10. TaghviS.MartaGM,Lang G et al Bronchial stump coverage with pedicle pericardial flap.An effective Method for prevention of postpneumenectomybronchoplueralfistula.An n Thoracic surgery 2005;79:284-8

Conflict of interest: None
Funding: None
Cite this Article as: Pawar D, Mankar S, Varshney S, Shortey V, Ramtani U, Cardiac Herniation Following Pneumonectomy. Natl J Integr Res Med 2015; 6 (2):108-110