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Traumatic Tracheo-Oesophageal Fistula: A Case Study

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Abstract: *Traumatic tracheoesophageal fistula is a rare and potentially fatal condition. The rarity of this emergency makes it challenging to obtain exclusive clinical experience and it is also challenging to obtain firm scientific evidence that informs patient management and clinical decision-making. If done at the earliest then radiological investigations are important for patient management as they result in timely diagnosis and suggest necessary interventions thereafter. Good attention to all symptoms and signs and timely diagnosis based on imaging may translate into better outcomes for these patients, no matter young or elderly. Surgical operation is then an option for the patient, but a nonoperative approach, with or without use of an endoscopic stent, should be considered when the clinical situation allows for a less invasive approach.*

Keywords : *Critical care, Emergency, Fistula, Oesophagus, Traumatic*

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I. Introduction

Traumatic tracheoesophageal fistula(TOF) is a very rare and possibly life-threatening clinical situation with significantly mortality rates[1,5]. The wide range of symptoms and signs along with a lack of specific experience regarding this condition may delay rapid identification of this potentially fatal condition[1]. Traumatic esophageal injury, and complications of perforation are often emergency occurrences. The increasing use of cross-sectional imaging, the availability, theease of use and the often nonspecific manifestations of acute esophageal conditions all ensure a role for CT in the initial detection and diagnosis. In addition, CT is a useful aide to conventional esophagography and direct visualization, outlining the location and limit of disease, assessing complications, and excluding differential diagnoses [2].In this article, we focus on the role of radiological imaging in esophageal perforation, as they are most helpful for early diagnosis and that should prompt appropriate case management.Perforation due to blunt trauma is extremely rare, with an incidence of less than 1% (0.001%). In 82% of cases, esophageal perforation secondary to blunt chest trauma occurs above the level of the carina [5].External air-blast trauma and blunt trauma are some of the rare causes of tracheoesophageal fistula. Penetrating sharp injuries, i.e. external trauma, can damage the superficially located cervical esophagus as well as the thoracic portion of the esophagus [1]. An established patent tract from the airway to the upper-gastrointestinal tract bypasses the normal protection offered by the laryngeal reflexes.The majority of acquired TOF occur at cervico thoracic junction [3].

II. Discussion

1 Aetiology And Pathophysiology

Earlier infection was considered a major cause of TOF but now it is widely observed that iatrogenic, malignant and traumatic causes have superseded it. In current times, about 50% of acquired TOFs are secondary to mediastinal malignancy i.e. tumoursarising from the oesophagus, trachea, lungs, larynx, thyroid and regional lymph glands have all been reported as prerequisites to the formation of an acquired TOF. The non-malignant causes of acquired TOF are reported to be blunt or penetrating trauma, infection, previous surgery of trachea and oesophagus, corrosive fluid ingestion, small battery ingestion and iatrogenic [3].Road-traffic accidents, resulting in chest wall crush injuries as aresult of steering wheel impact, cause the majority of traumatic fistulae. Compression of the trachea and oesophagus betweenthe sternum and the thoracic spine results in laceration and disruption of blood supply. This causes a delay in presentation of 3–10 days whilst necrosis develops. Although much less common, a more acute presentation can occur as a result of traumatic tracheal and oesophageal rupture [3].

2. Pathophysiologic Basis:

The esophagus is located in the prevertebral mediastinum and is subdivided into four anatomic regions: cervical, thoracic, lower thoracic-esophageal junction, and abdominal [4].A number of factors those predispose the esophagus to injury, include its close approximation to extrinsic structures at the level of the cricopharyngeal muscle, left mainstream bronchus, aortic arch, and diaphragmatic hiatus [4].

3. Pathological Sequelae

Aspiration of oesophageal contents such as Saliva, food and gastric juice occurs into the trachea due to laryngeal evasion. This leads to congestion, infection, pneumonia, bronchial obstruction, atelectasis and respiratory distress. The contamination's severity depends upon extent of fistula and the posture of the patient [3]..

4. Sign And Symptoms

Chest pain is the cardinal symptom of TOF. 'Ono's sign' which refers to the uncontrolled coughing after swallowing is the main sign of TOF. Other features which should raise suspicions of an acquired TOF are: history of trauma, malignancy or ingestion of caustic substances; chest pain; haemoptysis; shortness of breath; dysphagia; hoarseness; pyrexia of unknown origin; repeated respiratory tract infections; and pneumonia[1,3]. The pain associated with esophageal perforation is usually acute and sudden in onset, with radiation to the back or to the left shoulder. The triad of vomiting, chest pain and subcutaneous emphysema is known as the Mackler triad [1]

5. Investigations

Diagnosis of a TOF relies on radiographic evidence [1].Radiographic evaluation should begin with a X-ray chest PA view in cases of suspected cervical esophageal injury and it may reveal evidence ofsubcutaneous surgical emphysema, pneumo mediastinum air in the prevertebralfascial planes, pleural effusion/hemothorax, pneumothorax, hydrothorax, lung contusion/consolidation, rib fracture and collapse of lung.

If patient is stable and cooperative, barium swallow can be performed. Barium sulfate has a higher density with improved mucosal adherence, allowing improved diagnostic accuracy identifying 60% and 90%of cervical and thoracic or abdominal perforations, respectively.Contrast will demonstrate the defect in 70% of lesions [4]. Barium Sulphate has some drawbacks, as it is not as rapidly absorbed as water-soluble high-osmolality contrast agents, making additional imaging examinations challenging. Furthermore, extravasation of barium sulfate can be associated with inflammatory reactions and the possibility of subsequent fibrosingmediastinitis and granuloma formation [6]. Barium swallow can identify the location and extent of the TOF. Barium esophagram also shows the characteristic double barrel, a finding indicative of intramural dissection[2].Computed tomography (CT) may play both primary and complementary roles in their diagnosis and evaluation. The site of perforation and the degree of containment may be easier to judge by CT than by plain chest X-ray.CT may be useful also in patients who are unstable and unable to cooperate or as a complementary aide to contrast-enhanced luminal studies, to further delineate the borders of the extent of disease, understand complications, and chalk out therapy [1, 2, 3]. High resolution CT scans of the chest were obtained from the thoracic inlet to the lung bases [8].CT can be important on determining the extent of the TOF and the need for surgical versus nonsurgical intervention.CT findings may frequently be identical between iatrogenic and non-iatrogenic injuries[4].First, CT images are reviewed for extrapulmonary air and its anatomic location, extrapulmonary air can be seen as soft-tissue emphysema in the neck, pneumomediastinum, paratrachealair,tracheal wall defect, pneumothorax, esophageal wall thickening, periesophageal gas, focal esophageal wall defect,retroperitoneal air, pneumoperitoneum, and pneumopericardium, hemothorax, lung contusion, lung consolidation, rib fractures. Further CT images can be reviewed to assess whether direct visualization of the tracheal injury [2,8,9].

III. Case Presentation

A 17-year-old male was brought in the Emergency and trauma accident in succession to a road traffic accident. The patient had sustained multiple injuries to chest and neck and complained of dyspnea and severe chest pain. Under all the septic conditions intercostal drainage tube was placed in bilateral pleural spaces. Patient was stabilizedbut he complained of dysphagia and coughing on swallowing and oral consumption also known as ono's sign.Primary chest radiograph revealed extensive surgical emphysema in intramuscular plane, pneumomediastinum and lung contusions (FIG 1).As ono's sign was observed, barium swallow was performed and contrast was seen in trachea, right main bronchus and right lower lobe bronchus and upto alveoli.RCT chest was performed for confirmation of tracheoesophageal fistula and the findings were, bilateral extensive lung contusions,extensive

surgical emphysema in intramuscular planes,pneumomediastinum and defect in membranous tracheal lumen in upper part.

IV. Figures

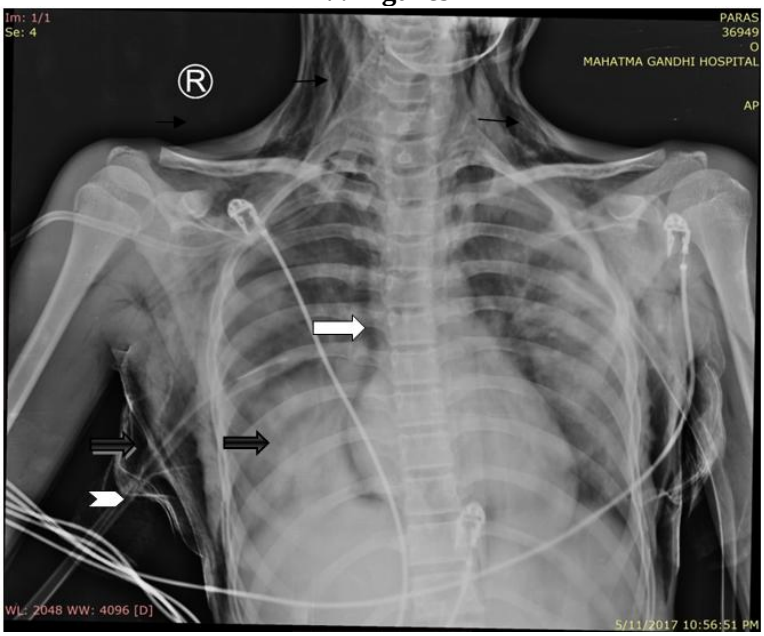


FIG.1 Xray chest(PA view) Intercostal drainage on both side(⇛)Pneumomediastinum(⇨)Lung contusions (➡).intramuscular surgical emphysema(→)

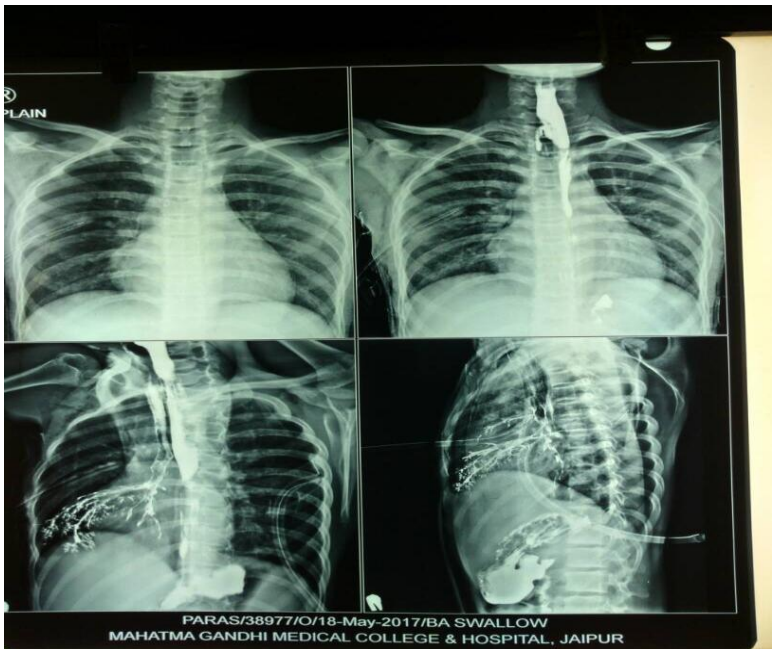
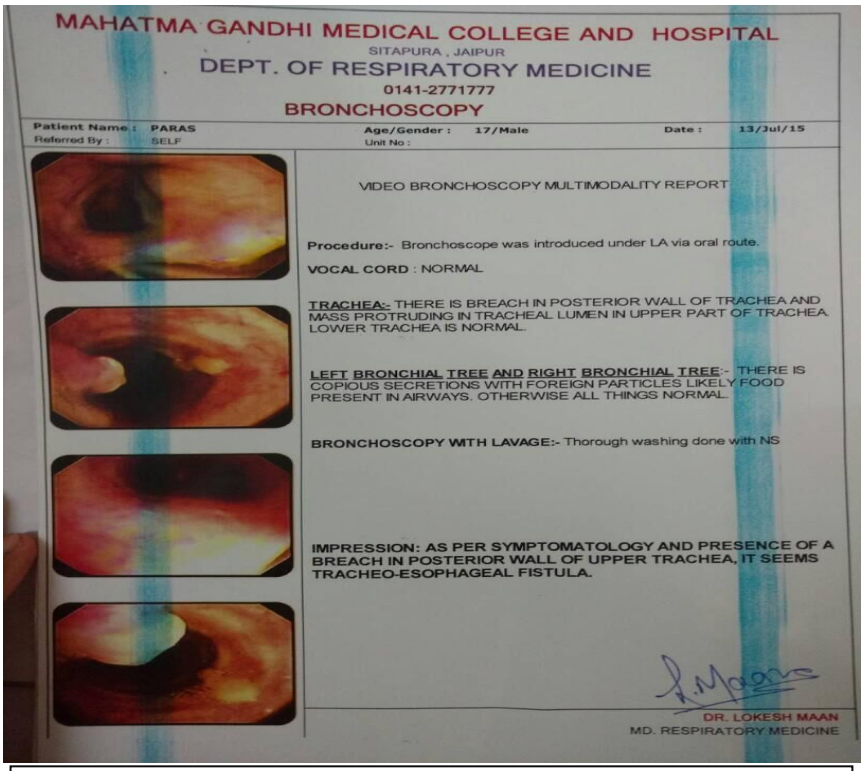


FIG. 2 shows tracheobronchial contrast inflowing from cervical esophagus (⟶)
Contrast is seen in in right tracheo-bronchial tree up to alveoli. ()


MAHATMA GANDHI MEDICAL COLLEGE AND HOSPITAL
SITAPURA , JAIPUR
DEPT. OF RESPIRATORY MEDICINE
0141-2771777
BRONCHOSCOPY

Patient Name : PARAS
Referred By : SELF
Age/Gender : 17/Male
Unit No :
Date : 13/Jul/15

VIDEO BRONCHOSCOPY MULTIMODALITY REPORT

Procedure:- Bronchoscope was introduced under LA via oral route.

VOCAL CORD : NORMAL

TRACHEA:- THERE IS BREACH IN POSTERIOR WALL OF TRACHEA AND MASS PROTRUDING IN TRACHEAL LUMEN IN UPPER PART OF TRACHEA. LOWER TRACHEA IS NORMAL.

LEFT BRONCHIAL TREE AND RIGHT BRONCHIAL TREE:- THERE IS COPIOUS SECRETIONS WITH FOREIGN PARTICLES LIKELY FOOD PRESENT IN AIRWAYS. OTHERWISE ALL THINGS NORMAL.

BRONCHOSCOPY WITH LAVAGE:- Thorough washing done with NS

IMPRESSION: AS PER SYMPTOMATOLOGY AND PRESENCE OF A BREACH IN POSTERIOR WALL OF UPPER TRACHEA, IT SEEMS TRACHEO-ESOPHAGEAL FISTULA.

DR. LOKESH MAAN
MD. RESPIRATORY MEDICINE

FIG. 3 Bronchoscopy revealed breach in the posterior wall of tracheal lumen in upper part.

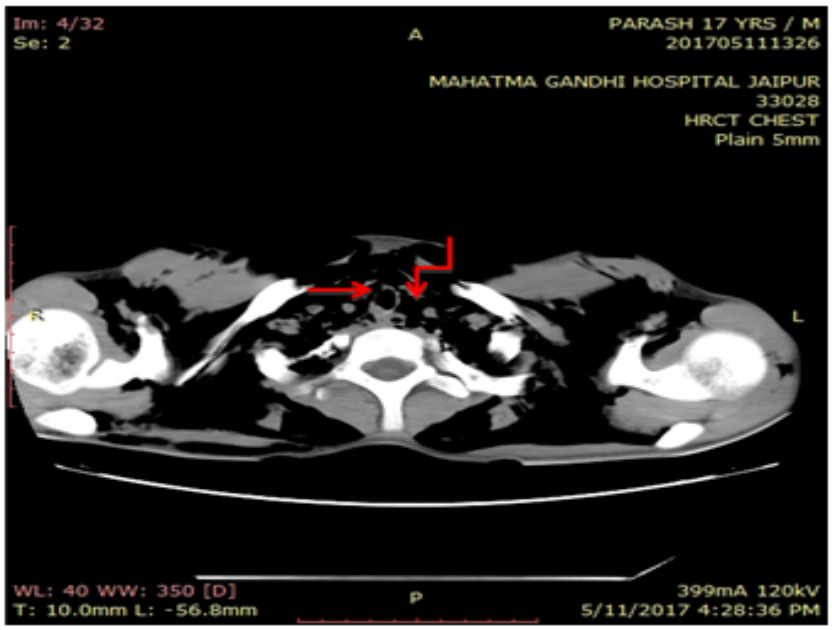


FIG. 4 shows axial image with defect (→) in membranous trachea in upper part and extensive Para tracheal air (↵)

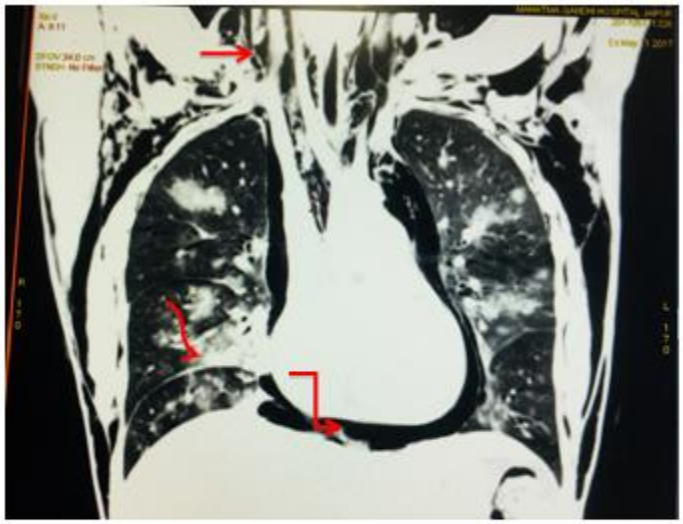


FIG. 5 shows coronal image with extensive surgical emphysema tracking up to neck (→).Evidence of pneumomediastinumwith complete diaphragm sign(↳) and multiple lung contusions (↳)

FIG. 6 X ray chest PA view, Post oesophageal stent placement

V. Conclusion

It is observed in this case study that CT is a useful add on to barium esophagography and chest radiograph in the diagnosis and evaluation of trachea esophageal emergencies. CT findings prove to be of utmost importance when dealing with conditions of high index suspicion and where findings are subtle yet highly significant. Multiplanar images are highly suitable for this condition and give the best conclusion regarding the disease resulting in faster and detailed diagnosis which in turn result in better outcome.

References

[1]. Søreide JA, Viste A. Esophageal perforation: diagnostic work-up and clinical decision-making in the first 24 hours. e Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine 2011, 19:66 http://www.sjtrem.com/content/19/1/66
[2]. Young CA, Menias CO, Bhalla S, MD • Srinivasa R. Prasad, MD.CT Features of Esoph-ageal Emergencies1 RadioGraphics 2008; 28:1541–1553 • Published online 10.1148/rg.286085520
[3]. Raman D, Shaw IA. Acquired tracheo-oesophageal fistula in adults. ContinEducAnaesthCrit Care Pain (2006) 6 (3): 105-108
[4]. MadanR, BairRJ, Chick JF. Complex Iatrogenic EsophagealInjuries: An Imaging Spectrum AJR 2015; 204:W116–W125
[5]. Piotr M, Sławomir J, Artur T.Cervical esophageal rupture after blunt trauma resulting
[6]. from a car accident.KardiochirurgiaiTorakochirurgiaPolska 2016; 13 (3): 262-264
[7]. Ginai AZ, ten Kate FJ, ten Berg RG, Hoornstra K.Experimental evaluation of various available contrastagents for use in the upper gastrointestinaltract in case of suspected leakage: effects on mediastinum.Br J Radiol 1985; 58:585–592
[8]. Reed JW, Doyle SE, Aprhamien C. Tracheosophageal fistula after blunt chest trauma. Ann Thoracic surgery 1995;59:1251-6
[9]. Chen J, Shanmuganathan K, Stuart ME, Killeen KL, Dutton RP. Using CT to Diagnose TrachealRupture. AJR 2001;176:1273–1280
[10]. A. Askerova, I. Yagizarov, G. Karmazanovsky, Y. Esakov, A.Pechetov, Y. Starkov; Moscow/RU.Acquired tracheoesophageal fistula: the pictorial review.ECR 201610.1594/ecr2016/C-0506