The Journal of International Medical Sciences Academy
2025; (January-March); Vol 38; No. 1

CASE REPORT

Fatal Barium Aspiration Pneumonitis: A Case Report

Yatin Gupta[1], N. P. Singh[2], Anoop Chhabra[1]

Abstract

Barium Aspiration Pneumonitis is an infrequent complication which may occur inadvertently during examination of the upper gastrointestinal system with barium study using contrast media. Owing to relatively non-irritant nature of barium sulphate, its aspiration is unlikely to cause severe lung injury. However, though rarely, large amounts of barium sulphate are aspirated accidently which may result in inflammation or rarely even death.

Here we present the case of a patient who had fever and difficulty in swallowing. For dysphagia, a radiographic contrast study with barium sulphate was done. Accidently the patient aspirated a large amount of the radiographic medium and became dyspneic. Chest X-rays showed multiple patchy and confluent radio opacities in bilateral lung fields and linear radio opacities along the tracheal and bronchial line. X-ray findings were suggestive of post procedural aspiration of barium contrast. Patient was shifted to MICU and was intubated but the next day evening patient developed hypotension. He was put on vasoconstrictors but developed cardiac arrest and could not be revived.

Key words: Barium swallow, barium sulphate, aspiration pneumonitis

[1]Pt. Neki Ram Sharma Govt. Medical College, Bhiwani-127 021, Haryana, India

[2]Dept. of General Medicine, Faculty of Medicine & Health Sciences, SGT University, Budhera, Gurugram, Haryana, India

Correspondance: Dr. Yatin Gupta, Assistant Professor, Pt. Neki Ram Sharma Govt. Medical College, Bhiwani-127 021, Haryana, India

Address: 278, Vikas Nagar, Bhiwani -127 021, Haryana
Email: dryatingupta@gmail.com

Received: 06th December 202
Accepted: 10th August 2024
How to Cite this Article: Gupta Y, Singh NP, Chhabra A. Fatal Barium Aspiration Pneumonitis: A Case Report. J Int Med Sci Acad 2025;38(1):43-45.

Access this article online : www.imsaonline.com

Introduction

Barium sulphate, a radiographic contrast medium, is a relatively insoluble salt of barium. Barium swallow is a common routine procedure adopted for examination of the oropharynx and esophagus [1]. During upper-gastrointestinal radiographic contrast procedure, rarely large amounts of barium sulphate are inadvertently aspirated into the lung which may result into complications like airway obstruction, chemical pneumonitis, lung injury and even death.

We report a rare case of fatal barium aspiration pneumonitis in a 75-year-old female who initially presented to the otolaryngology department with complaints of fever and difficulty in swallowing. A barium swallow study was performed to evaluate dysphagia, during which the patient accidentally aspirated a large amount of contrast medium and developed acute dyspnea. She was immediately transferred to the emergency ward, where detailed clinical evaluation and investigations were carried out, and supportive therapy was initiated. Despite treatment, her condition progressively worsened, necessitating transfer to the medical intensive care unit (MICU) and endotracheal intubation. However, her respiratory distress and hemodynamic instability continued to deteriorate and by the following evening, she suffered cardiac arrest and could not be revived despite resuscitative efforts.

Case Report

We present the case of a 75-year-old female patient who initially presented in the outpatient department of Otolaryngology with the complaints of fever and difficulty in swallowing. The patient was evaluated for dysphagia. Her laryngoscopic examination showed everything within normal limits. Thereafter, a radiographic contrast study by way of barium swallow test was done to assess the condition of oesophagus but unfortunately a large amount of the barium contrast accidently got aspirated into the airways and lungs and the patient became dyspnoeic.

The patient was immediately shifted to the casualty ward where the patient was attended by a team of General Physicians. Patient gave the history of low-grade intermittent fever, cough with expectoration and difficulty in swallowing for the last five days. There was no history of orthopnea or hemoptysis. There was no past history of tuberculosis, diabetes mellitus, bronchial asthma, hypertension or any other chronic illness. However, she gave the history of use of chullah (Wood fueled stove) for cooking.

On Examination the patient was found to have B.P. 90/76 mm Hg, Pulse Rate 118/mt., SPO_2 86% on room air and 94% with 3L of oxygen, Resp rate 22/mt. On auscultation crepitations were heard in both lungs while heart appeared normal. She was conscious and well oriented.

Investigations

Sputum Exam.	AFB -ve, CBNAAT -ve
CBC	Within Normal Limits
ABG Analysis	PH 7.268, PCo_2 44.6 mm Hg, Spo_2 80%
Kidney Function Test	Blood Urea 120.0 H mg/dl, Creatinine1.6 H mg/dl
Liver function Test	Bilirubin 1.4H mg/dl, AST 64 U/L , ALT 27 U/L
Serum Electrolytes	Within Normal Limits
ESR	06 mm Ist Hr
X-Ray PA view	Showed multiple patchy and confluent radio opacities in bilateral lung fields, predominantly in right upper and right middle zones with subpleural sparing. Linear radio opacities were seen along the tracheal and bronchial line. Findings were suggestive of post procedural aspiration of barium contrast (Fig.1). **However, CT Chest was not in view of the precarious condition of the patient.**
Barium Swallow	A thick bolus given and serial films taken after deglutition but during the test, the patient inhaled barium contrast medium into the bronchial tree. Both lungs, valleculae and pyriform fossae appeared normal. No evidence of irregularity or filling defect seen in thoracic oesophagus. Gastro-oesophageal function appeared normal. No evidence of reflux or hiatus hernia seen. Radio-opacification seen along the trachea, bronchi and its lobar branches, likely to be due to barium aspiration. No significant oesophageal abnormality seen in barium study.

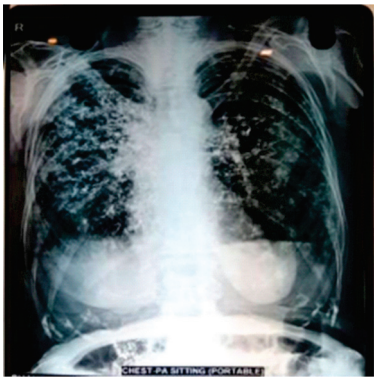

Figure 1: Fatal Barium Aspiration Pneumonitis: A Case Report

Treatment

Patient was immediately put on IV fluids, IV antibiotics, oxygen support and other supportive measurements but the measures proved inefficacious. In the evening patient's condition deteriorated further and she developed increasing respiratory distress and ABG was suggestive of Type 2 respiratory failure and the Patient was shifted to MICU and was put on non- invasive mechanical ventilation but the patient was unable to maintain saturation on Bipap support. She had altered sensorium and her respiratory rate was persistently more than 40/mt. Later in view of increasing respiratory distress, patient was intubated and put on ventilator but the next day evening patient developed hypotension for which inotropic support was started but patient developed cardiac arrest but could not be revived. Patient was managed as per ACLS protocol.

Discussion

Barium swallow is a commonly practiced investigation for upper gastrointestinal examination. Barium sulphate is an inert material and is widely used to visualize anatomy and to reveal abnormalities in the gastrointestinal tract. Oral intake of Barium sulphate is usually harmless unless it is aspirated in large amounts. This investigation - technique is considered to be a safe procedure. However, during contrast studies of upper gastrointestinal tract, barium sulphate may accidentally be aspirated into the lungs and this is a well-established complication during such studies [2]. However, rarely barium may be aspirated during upper gastrointestinal examination which may lead to complications and even death [3,4]. If aspirated it may give rise to anaphylactic shock, airway obstruction, chemical pneumonitis, long term lung injury, clinical decompensation and even death [5,6]. In the hospital population, the overall incidence of aspiration pneumonia is estimated to be nearly 8 in 1000, but 40% of such cases remain asymptomatic and are detected incidentally [7]. The mortality rate in cases of massive barium aspiration is around 30% and it may exceed to 50% in patients having initial shock or apnoea, adult respiratory distress syndrome or secondary pneumonia [8]. However, the exact incidence is not known. Depending on the severity of the reported cases, incidence has been reported in the world literature either as rare [9,10] or frequent [11].

The gravity of complications is proportional to concentration and amount of barium aspirated. Severity of complications also depends upon anatomy of upper gastrointestinal tract and predisposing factors [6]. So, we should calculate the dose and volume of barium very precisely before administration and we should avoid this study in patients having predisposing risk factors like head and neck cancer, frequent aspirations etc. Here we should resort to alternative study measures [6,12]. We don't have appropriate treatment for Aspiration pneumonitis and we have to keep the patient on supportive therapy like oxygen supplementation, intravenous fluids and antibiotics to avoid superimposed infections [6,12].

The predisposing factors for the occurrence of aspiration might be alcoholism [10], the extremes of age [11] disordered swallowing, neuromuscular dysfunction, broncho-esophageal fistula [13], head and neck cancer and psychological illness. Psychological illness is usually associated with functional gastrointestinal disorders [14]. We should focus on early recognition of the predisposing factors, pre-treatment with antireflux medications, such as domperidone or omeprazole, and correct choice of contrast media. Unlike barium sulphate, iopydol (Hytrast®), normally used for bronchography, demonstrates no pulmonary harm [15].

For prevention of accidental barium aspiration, a check list of preventive measures is recommended:

1. To recognise the predisposing factors and to manage the

underlying risk factors

2. To give pre-treatment with antireflux medications if needed
3. To choose the correct type of contrast medium
4. To maintain proper positioning of the patient while undertaking barium swallow study. Make the patient sit upright or elevate the head end of the bed between 30 to 45 degrees during and after the procedure
5. **To avoid distractions like talking, watching on mobile etc. during the procedure. 6. To keep ready to handle unexpected events This check list is a takeaway message for the clinicians to reduce such a rare but fatal complication.** Fatal Barium Aspiration Pneumonitis is usually seen when barium swallow investigation is done in patients having predisposing risk factors. Contrast study in our patient showed no evidence of irregularity or filling defect in thoracic oesophagus, reflux or hiatus hernia and the study showed Gastro-oesophageal function also to be normal. Our case is rare and unique as barium aspiration occurred despite being having no predisposing factors and becomes still rarer as barium swallow proved fatal.

Conclusion

Barium swallow tests are done in patients with symptoms of dysphagia, swallowing disorders and the like. Before performing the test, we should review the general physical condition of the patient and rule out any predisposing factors. In case there is any predisposing factor, we should avoid barium swallow and resort to alternative study measures.

Complications of barium sulphate aspiration occurs due to use of inaccurate density and quantity of barium sulphate solution, the extent of tracheobronchial distribution and the general physical condition of the patient. So, we should use correct concentration and correct quantity of barium sulphate for this investigation.

Sources of Support

SGT Medical College, Budhera, Gurugram, Haryana, India Acknowledgements : We are grateful and owe our special thanks to Professor D. K. Sharma, HOD, Department of General Medicine, SGT Medical College, Budhera, Gurugram, Haryana, India for his kind support and his kind permission to utilize the clinical and investigational data of the patient.

Conflict of Interest:	Author declare no COI
Ethics:	There is no ethical violation as it is based on voluntary anonymous interviews
Funding:	No external funding
Guarantor:	Dr. Yatin Gupta, will act as guarantor of this article.

References

1. *1.Zaino C, Beneventano TC. Radiologic examination of the oropharynx and esophagus. New York: Springer; 1977, pp1-28.]*
2. *Pracy JPM, Montgomery PQ, Reading N. Acute pneumonitis caused by low- density barium sulphate aspiration. J Laryngol Otol 1993;107:347-8*
3. *Tsocos M, Schulz F, Vogel H. Barium aspiration with fatal outcome. Aktuelle Radiol 1998;8201-3.*
4. *Whiting J. Aspiration of barium. N Engl J Med 2003;348:2582-3.*
5. *Zhang L, Yang Y, Zhang J, Zhou X, Dong H, Zhou Y. Barium sulphate aspiration: Severe chemical pneumonia induced by a massive reflux of contrast medium during small bowel study. Forensic Sci Int. 2015 Aug:253:e16-9*
6. *Yan GW, Deng JF, Bhetuwal A. A case report and literature review of barium sulphate aspiration during upper gastrointestinal examination. Medicine (Baltimore).2017;96(47):e8821*
7. *Pikus L, Levine MS, Yang TX, Rubestin SE, Katzka DA, Laufer I et al. Videofluoroscopic studies of swallowing dysfunction and the relative risk of pneumonia. Am J Roentgenol 2003;180:1613-16.*
8. *Franquet T, Gimenez A, Roson N, Torrubia S, Sabate JM, Perez C. Aspiration diseases: Findings, pitfalls, and differential diagnosis. Radiographics 2000;20:673-85.*
9. *Chiu CY, Wong KS, Tsai MH. Massive aspiration of barium sulphate during an upper gastrointestinal examination in a child with dysphagia. Int J Pediatr Otorhinolaryngol 2005;69:541-4.*
10. *Tamm I, Kortsik C. Severe barium sulphate aspiration into the lung: clinical presentation, prognosis and therapy. Respiration 1999;66:81-4.*
11. *Venkatraman B, Rehman HA, Abdul-Wahab A. High resolution computed tomography appearances of late sequelae of barium aspiration in an asymptomatic young child. Saudi Med J 2005;26:665-7.*
12. *Hundemer GL, Kumar V, Vaduganathan M. Large volume barium aspiration. Proc (Bayl Univ Med Cent).2015;28(2):183—184.*
13. *Rasley A, Logemann JA, Kahrilas PJ, Rademaker AW, Pauloski BR, Dodds WJ. Prevention of barium aspiration during videofluoroscopic swallowing studies: value of change in posture. Am J Roentgenol 1993;160:1005-9.*
14. *Aalander T, Svaerdsudd K, Johansson SE, Argeus L. Psychological illness is commonly associated with functional gastrointestinal disorders and is important to consider during patient consultation: a population-based study. BMC Med 2005;3:8.*
15. *Ginai AZ, ten Kate FJ, ten Berg RG, Hoornstra K. Experimental evaluation of various available contrast agents for use in the upper gastrointestinal tract in case in case of suspected leakage. Effects on lungs. Br J Radiol 1984;57:895-901.*