Spontaneous aseptic pneumoperitoneum

M. R. Sreevathsa

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Abstract Pneumoperitoneum indicates the need for urgent laparotomy. But under certain clinical situations like, patient on ventilatory support should arouse the suspicion of supradiaphragmatic source of pneumoperitoneum. Supradiaphragmatic causes account for 10%. This article describes two patients, both on ventilatory support in the intensive care unit. Failure to recognize spontaneous aseptic-pneumoperitoneum can result in unnecessary laparotomy with its risks. Hence under relevant circumstances, non-surgical causes of pneumoperitoneum should be excluded.

Keywords Pneumoperitoneum. Barotrauma. Pneumomediastinum

Introduction

The presence of pneumoperitoneum invariably prompts a diagnosis of perforated hollow viscera. But in 10%, the source of pneumoperitoneum is supradiaphragmatic, particularly in patients on ventilatory support. The diagnosis is further compounded by the fact that the incidence of stress induced gastric ulceration and perforation is increased in the ICU setting. As a result of this diagnostic dilemma, the patient may be subjected to a needless laparotomy.

Case 1

A 35-yr-old female was admitted to the intensive care unit (ICU) of our hospital on 22nd May 1999 following road traffic accident and consequent head injury without any clinically evident chest or abdominal injury. Her Glasgow coma score (GCS) on admission was 5/15. CT scan of the brain showed acute subdural haematoma on the right side with midline shift. Patient was managed on artificial ventilatory support after the evacuation of hematoma. Three days later as GCS continued to be 5/15, a tracheostomy was done, following which a false passage was noted. Tracheostomy tube was repositioned into the tracheal lumen. Chest examination revealed equal and good air entry bilaterally. Chest x-ray done late in the day showed bilateral pneumothorax for which intercostal drainage (ICD) tubes were introduced bilaterally. A check x-ray showed complete lung expansion but air under diaphragm. Surgeon was consulted and he opined that there was no evidence of perforative peritonitis clinically. A diagnostic peritoneal lavage was done during which escape of air was noted at the time of introduction of the catheter followed by return of clear irrigation fluid. Nasogastric tube feeding was initiated and

M. R. Sreevathsa (✉)
Department of General Surgery,
M. S. Ramaiah Medical College and Teaching Hospital,
Bangalore - 560 054, India

E-mail: chee_vaccha@yahoo.co.in

patient's condition steadily improved. Tracheostoma was decannulated within a week of admission after weaning the patient off the ventilator.

Case 2

A 28-yr-old woman (in second trimester of pregnancy) was admitted to the ICU with history of consumption of organophosphorous compound on 29th May 2000. Her chest and abdomen were clinically normal. She developed muscle weakness and respiratory distress necessitating immediate ventilatory assistance. On 30th May, a chest x-ray revealed bilateral pneumothorax, probably due to barotrauma. Bilateral intercostal drainage tubes were inserted. With further improvement, patient was weaned off ventilator on 2nd June 2000. Intercostal drainage tubes were removed on 3rd June 2000. A check x-ray after removal of intercostal drainage tubes revealed gas shadows under both domes of diaphragm (Fig. 1). Clinical evaluation by the surgical team revealed no abnormal abdominal findings. Diagnostic peritoneal lavage was done and the returns were clear. Patient was started on nasogastric enteral feeding and her condition improved. However, she suffered an intrauterine death of the fetus, which was evacuated on 9th June 2000 and patient was discharged home subsequently.

Discussion

Pneumoperitoneum on a chest x-ray is associated in 90% of the cases with perforated hollow viscus [1]. In cases with history of trauma-surgery on artificial ventilation, non-surgical causes of spontaneous pneumoperitoneum are to be considered. Gynecological causes of pneumoperitoneum are well documented [2]. But extra abdominal sources of aseptic pneumoperitoneum are rare [3]. So in 10% of cases the

source of pneumoperitoneum is outside the abdomen, usually supradiaphragmatic. Pneumoperitoneum not requiring surgical intervention has been named variously in the past like aseptic spontaneous pneumoperitoneum, idiopathic pneumoperitoneum, spontaneous asymptomatic pneumoperitoneum [4]. Mechanisms of pneumoperitoneum following mechanical ventilatory therapy have been described [5, 6]. Earlier experimental studies have shown progression of intestinal emphysema into pneumoperitoneum and pneumothorax [7].

In case 1, misplacement of the tracheostomy tube resulted in a pneumoperitoneum through mediastinum, and in case 2, barotrauma led to bilateral pneumothorax. The pneumothorax led to pneumoperitoneum by one or both mechanisms described. A) A direct communication with peritoneal cavity via diaphragmatic fenestrations. B) Continued dissection in the retroperitoneum and rupture through the mesentery or entry through the foramen of Winslow. Many authors in the past have enunciated these mechanisms of spontaneous pneumoperitoneum resulting from pneumothorax [5].

The dilemma in the treatment of spontaneous pneumoperitoneum lies in deciding between a laparotomy and a conservative line of management. If a thorough history and physical examination is done, laparotomy rates can be reduced to near zero by following a proper algorithm [4]. A diagnostic peritoneal lavage can differentiate between non-surgical causes and causes necessitating a laparotomy [6, 7]. Instillation of a water soluble contrast through the nasogastric tube and an abdominal x-ray can also be very useful in detecting perforations as an intra-abdominal cause of pneumoperitoneum [8].

Conclusion

Recognition of spontaneous aseptic pneumoperitoneum is imperative in avoiding a needless laparotomy with its risks. Pneumoperitoneum occurring subsequent to ventilatory support is well documented as enunciated in our cases. Hence, under relevant circumstances, the possibility of a non-surgical supradiaphragmatic cause should be entertained after a good history, clinical examination, subsequently confirmed by Diagnostic peritoneal lavage and they managed conservatively.

Conflict of interest The author does not have any disclosable interest

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Fig. 1 Air under diaphragm (right hemidiaphragm)

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