Management of Traumatic Chylothorax

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The management of a case of traumatic chylothorax is described. After establishing the diagnosis, conservative management (including total parenteral nutrition) was tried over 2 weeks without any fruitful outcome. Prompt recovery was achieved following surgical intervention.

Chylothorax has received clinical recognition at least since the middle of the eighteenth century but the treatment was largely ineffective. Approximately 50% mortality was associated with traumatic chylothorax.1 In the past the problem was uncommon but is now more frequent. The number of cardiothoracic surgical procedures which are complicated by chylothorax has increased from 0.25 to 0.5%. There is also an increase in chest trauma causing sudden hyperextension of the spine, or injuries to the axilla and neck.1,2

The first successful surgical intervention for chylothorax was carried out by Lampson in 1948 and this event marked the turning point in the history of the management of chylothorax.

Case Report
A 7½-year-old Saudi boy was sitting inside a car when he sustained multiple injuries in a road traffic accident. The boy complained of pain in the right side of his chest and from a left axillary wound. On examination he was found to have multiple abrasions on the face and forehead. His vital signs were stable. There was tenderness in the right upper chest. The percussion note and air entry on both sides of the chest were equal and satisfactory. A deep lacerated wound was found in the floor of the left axilla measuring 5 cm x 4 cm, with no active bleeding or oozing. No abnormality was detected on examining the other systems. The chest X-ray showed a fracture of the first rib and clavicle on the right side with no evidence

Figure 1. Chest X-ray on the day of accident shows fracture of the first rib and clavicle on the right side. Both lung fields appear clear.
of haemo- or pneumothorax (Fig. 1). The left axillary wound was repaired, and the patient was admitted under the cardiothoracic surgical service. The initial haemoglobin was 12.7 g/dl; with haematocrit 38% and white cell count $4.2 \times 10^9/l$.

In hospital the patient progressed well until the third day, when he developed mild fever, anorexia, left-sided chest pain and pain over the axillary wound. On examination the axillary wound was found to be oedematous and swollen and obvious signs of a left-sided pleural effusion were detected. A chest X-ray showed total opacity of the left hemithorax (Fig. 2). On removing a stitch from the axillary wound, pinkish fluid gushed out. Pleural aspiration on the left side revealed fluid of the same colour. An intercostal tube (ICT) was inserted into the left pleural space and about 400 ml of liquid was drained; thereafter the left lung field became clear (Fig. 3). In the next 24 h 900 ml of liquid collected in the under-water seal bottle and the colour changed to milky white. It was odourless, non-clotting and the opacity became clear on mixing with ether. A diagnosis of chylothorax was made. The composition of the fluid was as follows: pH: 7.4; Na: 117 mmol/l; K: 3.7 mmol/l; protein less than 3 g/dl; sugar: 114 mg/dl; fat (triglycerides): 1160 mg/dl; total white cell count: 3520 mm$^3$ (poly: 65% lympho: 34% others 1%); RBC-320/mm$^3$.

The management started in a conservative way with continuous pleural drainage through the ICT, chest physiotherapy and supportive drugs. The left axillary wound healed satisfactorily but no evidence of reduction of chylous drainage was noticed. Following the insertion of the ICT an average of 1.17 ml/kg/h (400-900 ml daily) milky fluid drained for 6 days. A 2-week trial of total parenteral nutrition with nothing by mouth was started. No improvement of the drainage through the ICT was seen; it averaged 1.38 ml/kg/h (350-820 ml daily) but the colour of the liquid changed to serous. The patient developed a slight fever which subsided a couple of days later. His body-weight, haematological and biochemical status were maintained well during this period except that during the febrile period the leucocyte count was raised to $18 \times 10^9/l$.

As a strict conservative management regime had failed, surgery was planned and the patient was allowed to eat. In the next 24 h the drainage through the ICT was 1200 ml and the colour changed back to milky white. In the morning 2 hours before the operation 100 ml of olive oil was introduced into the stomach through a Ryle's tube and prior to anaesthesia the stomach contents were aspirated. A left posterolateral thoracotomy through the 4th intercostal space was made. After mobilizing the left lung, white chylous fluid was found trickling from the apex of the thoracic cavity. Dissection over the left suclavian artery revealed the leaking thoracic duct on the lateral aspect of the artery. Ligation of the severed thoracic duct with the overlying mediastinal pleura was made with 00 silk on either side of the tear. After the ligatures had been placed, the chylous leakage stopped completely. The postoperative period was uneventful and the patient was discharged home on the 12th postoperative day.

**Discussion**

The left-sided chylothorax of this patient was most probably caused from his left axillary wound.
After injury 2–10 days usually elapse before the clinical manifestations of pleural effusion are evident. This is due to the accumulation of lymph in the posterior mediastinum until the mediastinal pleura ruptures.\textsuperscript{1–3} The first clinical features of chylothorax are mild fever and anorexia, and the effusion is usually massive.\textsuperscript{1,4,5} The colour of the initial pleural fluid was pinkish due to blood staining from trauma.\textsuperscript{1,5}

Aspiration of milky white, odourless, non-clotting fluid from the pleural space is virtually diagnostic of chylothorax. The opacity of the fluid clears with ether extraction.\textsuperscript{4,5} Furthermore, if the fluid has a triglyceride level of more than 110 mg/dl there is 99% chance that the fluid is chylothorax.\textsuperscript{3} In this patient besides the obvious physical characters of chylothorax, the triglyceride level was very high (1160 mg/dl).

The management of postoperative and traumatic chylothorax is generally tried in a conservative way at first.\textsuperscript{1–4,6,7} The aim of the conservative management is based on two goals, first to reduce the chyle production and secondly to maintain the lung fully expanded. Maximum reduction of the chyle production is achieved by eliminating oral intake while the patient is supported by total parenteral nutrition (TPN).\textsuperscript{4,5} The second aim of the management is effectively achieved by continuous evacuation of the chyle through an ICT. A 2-week trial of conservative management with drainage is justified but if it fails, surgical intervention to close the severed thoracic duct should be undertaken.\textsuperscript{4} Identification of the leaking thoracic duct is usually difficult during operation. It can be visualized by giving 100–200 ml olive oil via the nasogastric tube 2–3 h prior to the operation.\textsuperscript{2} This method has been found to be very effective.

The management of traumatic chylothorax is a major surgical task as 50% of these patients do not respond to the conservative treatment and unless the persisting leaking thoracic duct is closed surgically the ultimate effect is disastrous and death is inevitable.

**References**