Congenital Diaphragmatic Hernia: A Case Report

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The true incidence of Congenital Diaphragmatic Hernia is difficult to be certain about. Publications based on hospital admissions (Gross, 1953; Bonham Carter et al, 1962; Rickam and Johnstone, 1970) seem to indicate an incidence of about 1 in 12,000 live births. According to Butler and Claireanx (1962) the true incidence is in the region of 1 in 1,120 still births and 1 in 4,000 live births. The British Perinatal Mortality Survey (Butler and Claireanx, 1962) showed that this malformation was present in 2,200 of all births and that it comprised 8% of all major fatal congenital anomalies; and also that many of the perinatal deaths with diaphragmatic hernias were grossly premature. It is, therefore, probable that majority of these cases do not get admitted to the neonatal surgical wards for repair.

We have had only one admission during the last 2 years and 10 months and we wish to report our case.

Case Report

Soon after birth, a normally born infant weighing 7lbs was seen to become cynosed on crying. Except for some respiratory rales on the left side of the chest no other abnormalities were detected by the doctor who examined the child first. Nursing the child in an incubator with 30 per cent oxygen did not prove the colour and the condition gradually deteriorated. Every attempt to suck its feeds brought on the cynosis and the frequency of such attacks increased. On examination, we found a fully grown, cynosed and breathless infant. There was minimal expansion of the left side of the chest and auscultation revealed marked intestinal gurgling of the same side. Except for the shifting of the heart to the right, no organic lesion of the heart were detected. A radiograph of the chest confirmed a left sided diaphragmatic hernia (No:1).

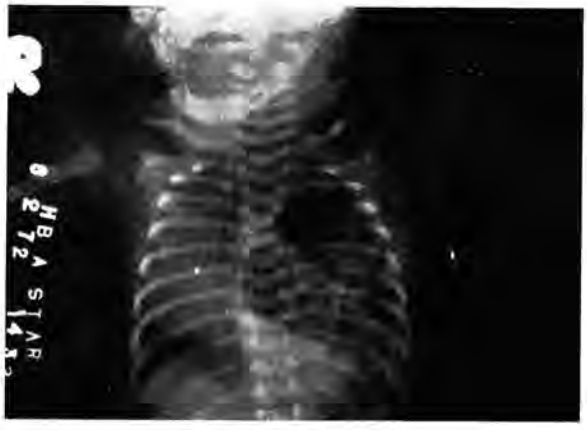

Fig. 1
Pre-operative X'ray.

This was an emergency of the first order. An endotracheal tube was inserted and lungs inflated by gentle positive pressure with oxygen. The stomach was frequently aspirated through a nasogastric tube. After wrapping the infant well, the case was transfered to the operation theatre, maintaining the positive pressure ventilation during transport.

The operation theatre had been prepared in advance to receive the infant. Only the air circulation without the air conditioning had been

maintained for sometime. The infant was placed on hot water bottles, and covered with sterile cotton, exposing only the area for the surgical procedure. General Anaesthesia mainly consisted of a combination of muscle relaxation with intermittent suxamethonium and positive pressure ventilation with 50 : 50 mixture of oxygen and nitrous oxide. After a preceding dose of 0.06 mg of atropine sulphate, an initial dose of 0.3 mg of suxamethonium was given intravenously to obtain muscle relaxation. Subsequently, incremental doses of 0.1 mg of suxamethonium was administered whenever relaxation was required. A 10% dextrose drip was set up, and a three way tap interposed between the scalp vein needle and the drip facilitated rapid replacement of lost blood. The pulse rate, peripheral circulatory status and temperature were monitored through out the procedure. The replacement of lost blood was based mainly on subjective estimation in correlation with the circulatory status. Thoracotomy performed through the eighth left intercostal space revealed complete absence of diaphragm, with loops of small intestine and transverse colon filling the space.

The small amount of lung tissue present was resistant to forced inflation and, was probably, hypoplastic. The repair of the defect was achieved by plicating the peritoneum from the posterior to the anterior end and the thoracotomy was closed, leaving a drain. The recovery from anaesthesia was uneventful with the infant maintaining good colour.

Post operatively the infant was nursed in an incubator for two weeks. Clinically, the air entry on the left side gradually improved. Radiograph of the chest (No: 2) taken immediately after the operation showed that the repair had been successful. There was a left sided pneumothorax and minimal return of the mediastinum to normal position. On the tenth post operative day the infant developed breathlessness and radiograph of the chest (No: 3)

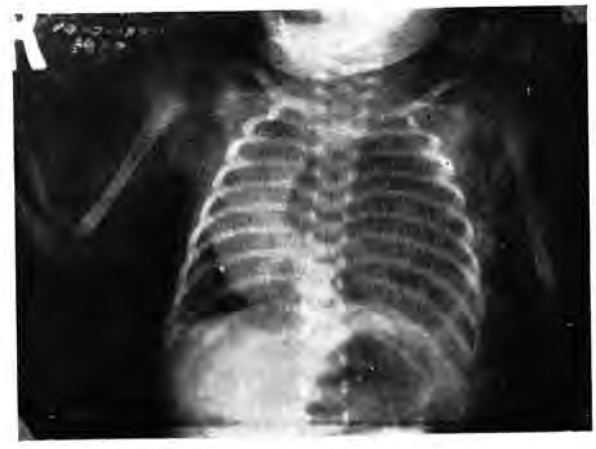

Fig. 3
On The Tenth Post-operative Day.

showed gas shadows which seemed to suggest a tension pneumothorax on the left side with marked shift of mediastinum. At a second thoractomy performed under general anaesthesia to exclude the possibility of recurrence we found pockets of pus filling the cavity. The repair was intact and was difficult to be certain whether the lung had expanded or not. Post operatively the infant continued to improve and since discharge on the 28th post-operative day has been followed up periodically. Radiograph of the chest (No: 4) taken two months

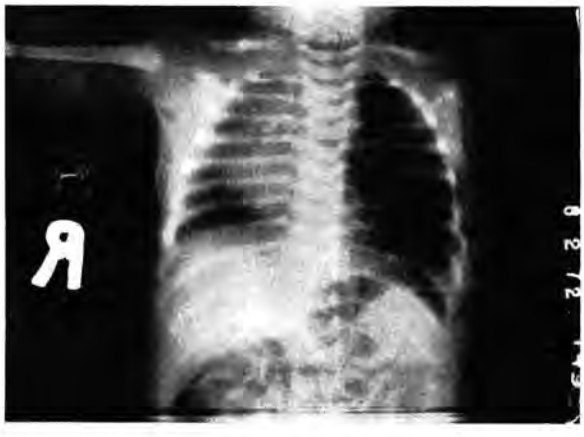

Fig. 2
Immediate Post-operative X'ray.

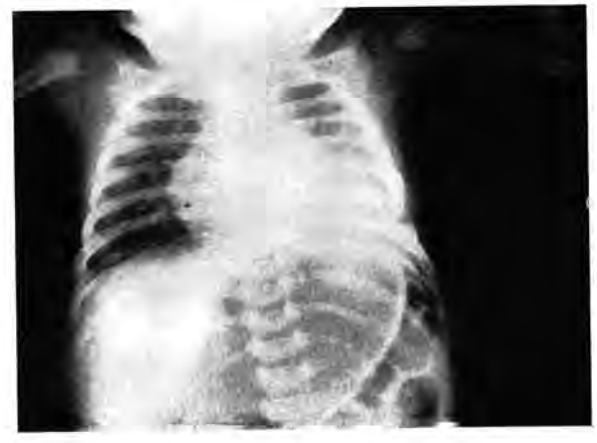

Fig. 4
At The Second Month.

after the surgery shows fully expanded lung on the affected side and the heart in the normal position. By the end of seventh month the child had grown both physically and mentally but the radiograph of the chest (No: 5) showed a gas shadow with shift

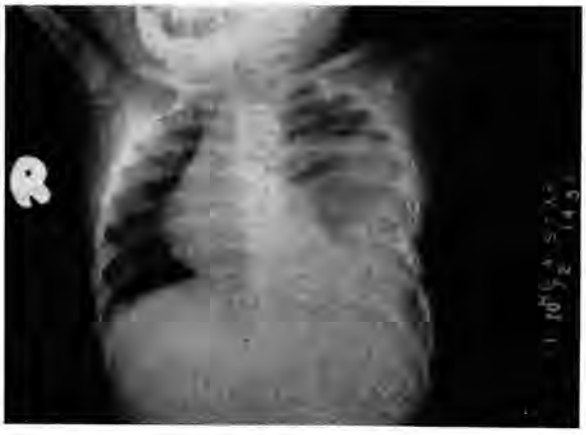

Figure 5
At The Seventh Month.

of heart to the opposite side suggestive of a recurrence. We were unable to confirm the diagnosis by screening using contrast medium for the child had died two weeks after the last radiograph had been taken.

Discussion

The most commonly encountered type of abnormality is the hernia through the Foramen of Bochdalek (Rickham and Johnstone, 1970; Bonham Carter et al, 1962). The other types of abnormalities include the absence of diaphragm on one side, and hernias through the Foramen of Morgagni and Para oesophageal openings.

In the newborn the onset of respiratory difficulties at birth is determined by the size of the hernia and the degree of dysfunction of the lungs and nearly always presents as an acute emergency. In contrast, in most of the older children the symptoms and signs are usually gradual in onset and may be referred to the pulmonary, alimentary, or cardiovascular system (Bonham Carter et al, 1962). The moment the diagnois is made nasogastric aspiration must be started to prevent further distension of stomach and intestines, and consequent shift of mediastinum. Positive pressure ventilation through an endotracheal tube must be instituted immediately, taking care not to employ high pressures. If the infant does not respond to these resuscitative measures, tension pheumothorax or mediastinal emphysema must be suspected and appropriate treatment given. The administration of oxygen through a close fitting mask or through an intragastric catheter must be avoided at all cost. It is important that the anaesthetist accompany the infant from the ward to the operation theatre in order to ensure adequate ventilation.

A naked infant ventilated with dry gases in a cold operation theatre rapidly looses body temperature (Cecil Gray and Nunn, 1971). Simple measures like wrapping the exposed areas in sterile cotton and using hot water bottles will have to be resorted to if modern facilities are lacking. New born infants are far less tolerant to blood loss and great care, therefore, must be exercised in assessing the loss and replacing it. In the absence of calorimetric method, subjective estimation of blood loss and the clinical status of the cardiovascular system of the infant will have to be relied upon. It is important to warm the blood before transfusion in order to avoid the complications of generalised hypothermia. Many methods are used in sophisticated centres, but we depend entirely on the heat exchange obtained by immersing the bottle in a waterbath, the temperature of which is kept at 40°C. The importance of prevention of hypoglycaemia in the new born infants, particularly in those suffering from respiratory difficulties, cannot be over emphasised (Cornblath and Reisner, 1966; Cornblath et al, 1966). It is our practice to use 10% dextrose solution pre and post operatively. The problems of post-operative ventilation and lack of expert nursing care can be so acute as to preclude the use of non-depolarising drugs for muscle relaxation in the new born infants, and employ instead, alternative techniques of general anaesthesia.

Older infants of adequate size with few serious associated abnormalities seem to survive better following operation. Gross (1964) reported that the survival rate of children operated upon for diaphragmatic hernia at Boston Childrens' Hospital have fallen drastically, because much younger infants with a much poorer survival rate are now admitted. The survival rate following operation was 100 per cent in infants over 24 hours of age, but it fell to 47 per cent in infant under 24 hours of age. When we saw the infant it was already 16 hours of age and was operated upon within an hour of diagnosis.

At the conclusion of the operation it was impossible to expand the small lung on the affected side, and consequently such an infant was left with a pheumothorax post-operatively (X'ray No: 2). In the course of succeeding days the lung on the affected side had expanded fully (X'ray No: 4), which may be taken as evidence that there was compression atelectasis of the lung rather than true hypoplasia (Bonham Cartel, 1962).

Conclusion

A case of Congenital Diaphragmatic Hernia is described and the relevant literature reviewed. Majority of the infants with this abnormality are either stillborn or die within a few minutes or hours of birth. The presenting symptoms are dyspneoa and cynosis. Control of ventilation and surgical repair of the defect must be undertaken as an emergency procedure. The age of the infant, absence of associated abnormalities, knowledge of pathophysiological processes and meticulours attention to detail are the criteria for the success of neonatal anaesthesia and surgery. The need for close collaboration between those involved in the care of these infants is vital.

Acknowledgement

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