"Prenatal Diagnosis of Chylothorax by Ultrasound" - A Case Report

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ABSTRACT — The Authors present a case of pleural effusion in a 36-week fetus, revealed by ultrasound.
At birth, a congenital chylothorax was diagnosed and the newborn was followed by X-ray examinations, until complete recovery.
The Authors emphasize the important role of ultrasound in prenatal diagnosis.

INDEX TERMS — Ultrasound, Congenital Chylothorax.

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Technological development in ultrasound equipment has led in the last few years to a great improvement in the resolution capacity and definition of the ultrasound image. This fact has given us the possibility of a more and more complete study of fetal anatomy in utero and of demonstrating a greater number of fetal abnormalities.

As far as the lymphatic system is concerned, ultrasound patterns of fetal abnormalities responsible for major alterations of morphology such as cystic hygromas (Adam 1979, Frigoletto 1980, O'Brien 1980, Phillips 1981), cystic lymphangioma (Adam 1979), and lymphatic system atresia (Adam 1979) have been described.

More rare is the prenatal echographic identification of chylothorax (Deefort 1978), a fetal abnormality characterized by the accumulation of chyle in the pleural space.

Taking into consideration the rarity of this finding in the prenatal age group, we consider it interesting to report our experience of a case of fetal chylothorax, identified in utero by ultrasound at 36 weeks of pregnancy.

This observation seems to be the first case of congenital chylothorax not associated with other anomalies revealed in utero by ultrasound.

CASE REPORT

F.A., age 33, gravida 2, para I, underwent ultrasound examination at 36 weeks of gestation.

Previous clinical examinations and laboratory data confirmed a pregnancy in normal evolution; this patient had already undergone ultrasonic scanning at 14,23 and 31 weeks of gestation. The ecographic biometrical parameters (14 weeks: CRL = 79 mm, BPD = 2.8 cm; 23 weeks: BPD = 5.4 cm, TTD = 5.5 cm, TAD = 6 cm,

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femur = 4.2 cm, humerus = 4 cm; 31 weeks: BPD = 7.6 cm, TTD = 7.6 cm, TAD = 8.2 cm) suggested normal fetal growth, excluding any anatomic and morphologic abnormality of the fetus.

The ultrasonic examination was carried out with an Aloka SSD 250 real time apparatus with a 3.5 MHz linear array probe (sound speed = 1540 m/sec).

The presence in utero of a single alive fetus of female sex, situated in a longitudinal position, head downwards, was detected.

Biometrical parameters were significant for normal fetal growth (BPD = 8.9 cm, TTD = 8.6 cm, TAD = 9.7 cm, femur = 7.1 cm, humerus = 6.3 cm, anterior placenta grade 2).

Scanning of sthe fetal thorax showed an altered anatomic and morphologic pattern due to the presence in the right hemithorax of a large transonic area which could be referred to the presence of quite a large amount of liquid in the space between the parietal and visceral pleura (Figs. 1 and 2). The ipsilateral lung appears reduced in size, and its lobes are well distinguishable and show passive movements connected with heart beats.

After consideration of gestational age, fetal growth and the absence of ultrasonic and cardiotocographic signs of fetal distress, pregnancy was carefully monitored until 38 weeks when a caesarean section was carried out on the basis of the prenatal diagnostic suspicion.

A single, alive and vital female fetus was delivered weighing 3200 gr., which was immediately intubated. Blood gas analysis showed severe respiratory distress; chest x-ray film showed a large opacity of the right hemithorax without an "air bronchogram sign", a contralateral shift of the mediastinum and trachea, and hypoventilation of the left lung (Fig. 3).

The picture was consistent with a large accumulation in the right hemithorax pushing

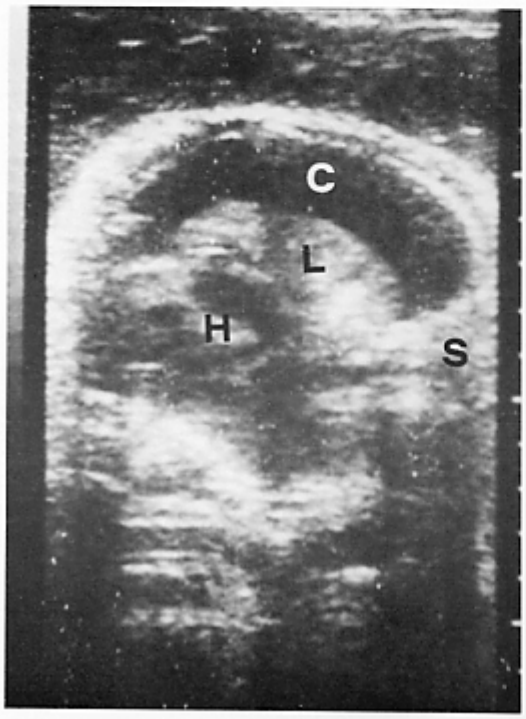


Fig. 1 – Echographic transverse section of fetal chest; C: transonic area in the right hemithorax, L.: right lung, H: heart, S: spine.

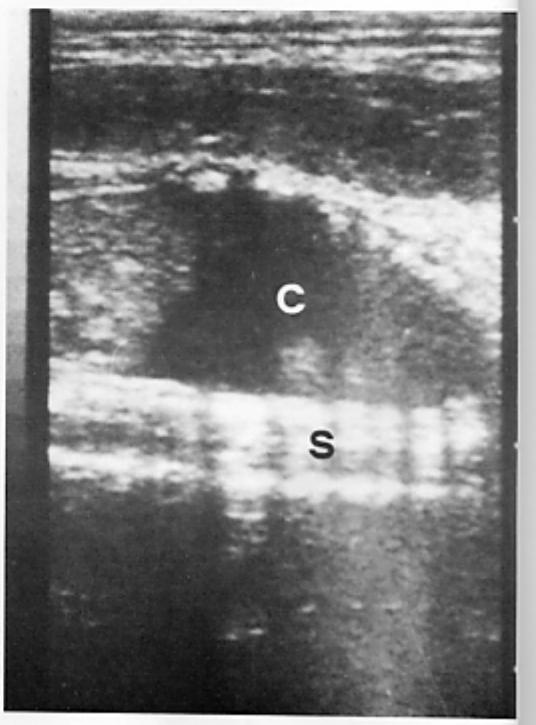


Fig. 2 – Echographic longitudinal section of right hemithorax; C: transonic area, S: spine.

aside the mediastinum and compressing the contralateral lung.

Diagnostic thoracentesis showed the presence in the pleural space of a yellow liquid; as soon as a thoracic drainage was placed, 200 cc of liquid were drained.

Chest x-ray film after drainage (Fig. 4) showed normal expansion of both lungs and the mediastinum in the midline with normal morphology.

In the following days, variable amounts of fluid were drained (10 to 40 cc), and when the baby started milk feeding, the fluid showed the typical appearance of chyle.

On the 12th day of life there was a reduction in the amount of chyle drained; therefore, after a chest roentgenogram, the chest tube was closed and taken out on the 16th day.

The baby was discharged on the 21st day in good general condition.

Daily measurement of plasma protein levels never showed any decrease in albumin; for this reason the medium-chain triglyceride diet (MCT) suggested by some workers (Broadman 1974, Craenen 1977, Peitersen 1977, D'Eufemia 1979) in similar cases of congenital chylothorax, seemed useless.

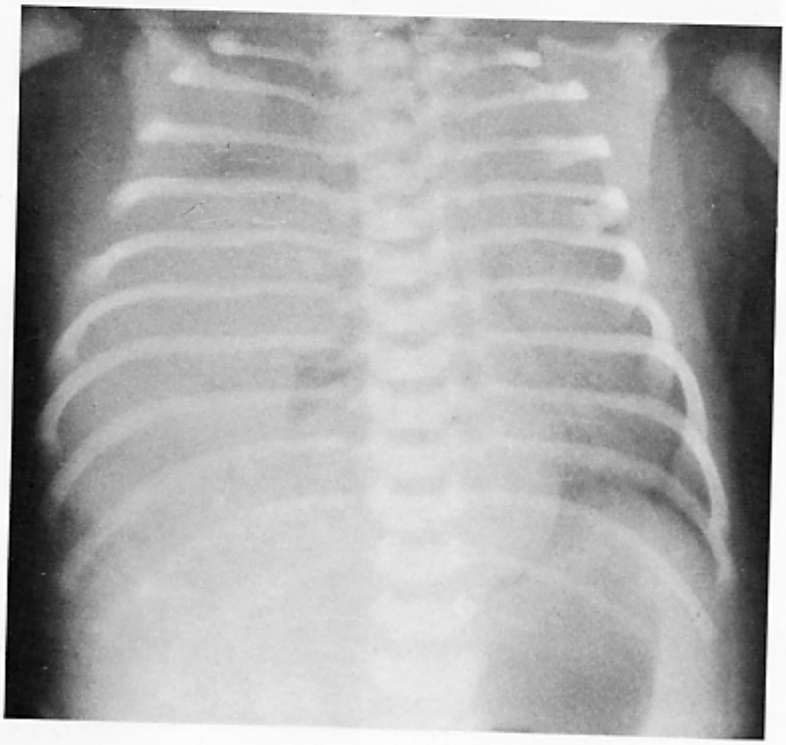
Chest X-ray films after two months (Fig. 5) were absolutely normal, without any abnormality of the right pleura or lung; the mediastinum was in the midline.

Comment

Chylothorax is the most frequent cause of pleural effusion in the newborn (Chernick 1970). More often on the right side, presumably because of the close relation between the lower portion of the duct and the right pleura, although it can also occur on the left side or occasionally bilaterally (Bensoussan 1975, Sardet 1981).

The etiology in most cases is still unknown, so are referred to as congenital or spontaneous chylothorax.

In rare cases it is associated with malformations or anomalies of the thoracic duct (Stewart 1926, Boles 1960, Kirkland 1965), or with lymphangiomatosis (Morphis 1970, Takamoto 1971, Berberch 1975). Also an



g. 3 – Chest x-ray filom at birth.

atrogenic genesis of such anomaly has been described, secondary to thoracic and cardiovascular surgery in the newborn (Gershanik 1974, Vain 1980) or to obstruction of the vena cava following prolonged parenteral nutrition in premature low birth weight infants (Vain 1980).

Clinical symptoms appear in 50% of cases within the first 24 hours of life (Chernick 1970), with different degrees of respiratory distress. Diagnosis is based on the X-ray film which shows an opacity of the hemithorax with b mediastinum in the midline or shifted to the other side; and on the thoracentesis, which initially reveals a clear yellow liquid of a lipid composition identical to that of blood; only after the infant has been fed on milk the liquid shows the typical characteristics of chyle.

As reported in the case we observed, ultrasound examination has given the possibility to anticipate the diagnosis from a neonatal to a prenatal age, so being possible to evidentiate correctly in the fetus an echographic pattern significant for the presence of a pleural effusion.

This pattern is characterized by the presence at the thoracic level of fetal scanning of a large transonic area which occupies the hemithorax, pushing the lung towards the mediastinum, which suffers a shift in the axis.

The transonic appearance of the effusion is significant for a liquid accumulation and suggests the presence of chylothorax especially

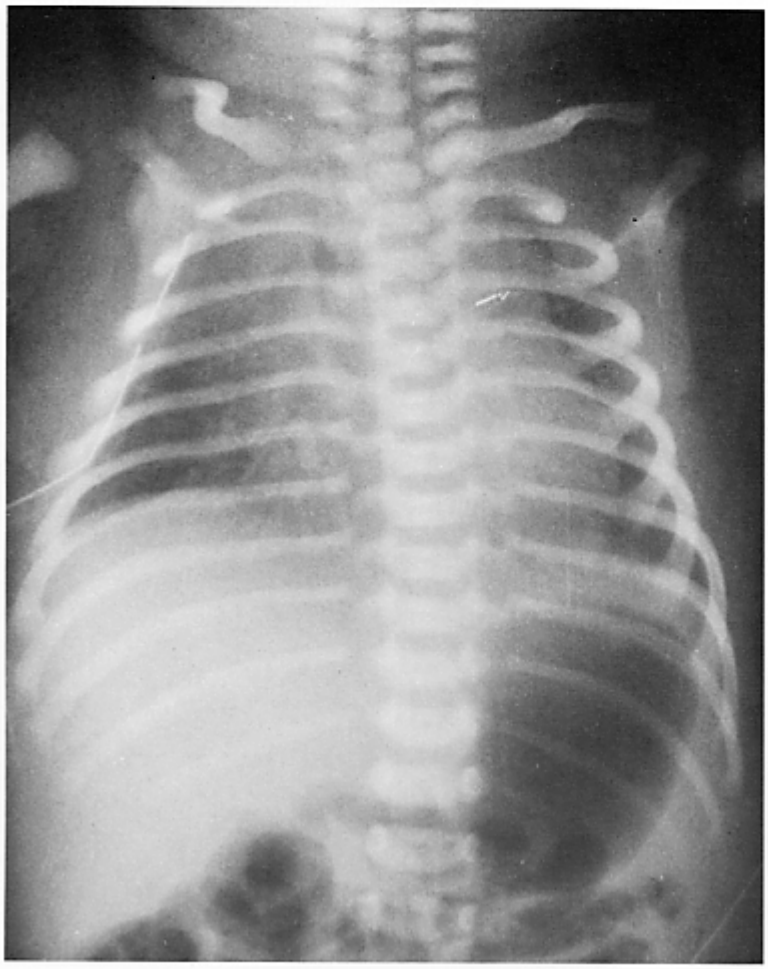


Fig. 4 - Chest x-ray film after drainage.

when it is situated in the right hemithorax, always keeping in mind that chylothorax is the most frequent form of liquid accumulation in the pleural space in the perinatal age (Chernick 1970) when ascites or fetal abnormalities can be excluded.

In the case we observed, ultrasound examination showed that the pleural effusion occurred in the last month of pregnancy, having been absent in the previous ultrasonic examinations.

Prenatal echographic diagnosis of chylothorax enables one to plan the day of delivery in a hospital with complete equipment for treatment of the newborn.

Accurate ultrasound scanning of a fetus showing a pleural effusion also excludes the association of other anomalies and alterations detectable by ultrasound (ascites, hydrops, polydramnios). This as it is of particular prognostic importance since, as is reported in other studies (Vain 1980) and confirmed by the case we observed, spontaneous chylothorax when correctly treated has a favorable evolution.

RIASSUNTO

Viene presentato il caso di un versamento pleurico in un feto alla 36ª settimana, dimostrato ecograficamente.

Alla nascita è stata fatta diagnosi di chilotorace congenito, e la neonata è stata seguita radiologicamente fino a guarigione completa.

Viene messo in rilievo l'importante ruolo svolto dall'ecografia nella diagnosi prenatale.

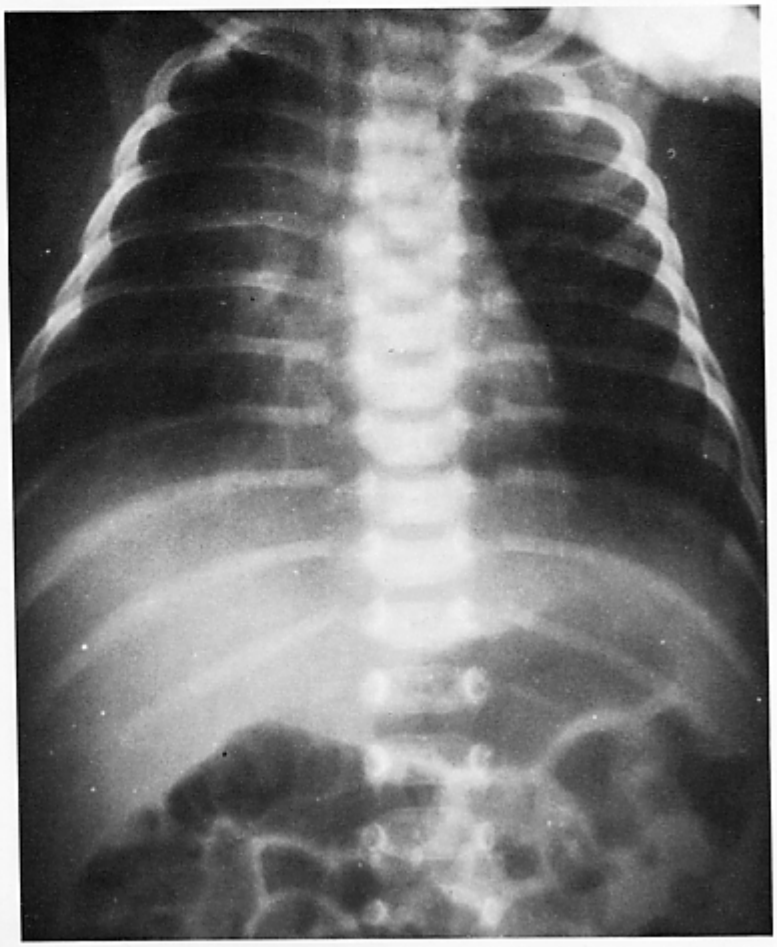


Fig. 5 - Chest x-ray film after two months.

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