

Hydrothorax (pleural effusion)



Hydrothorax is the accumulation of fluid in the pleural space. Diagnosis is based on the demonstration of fluid collection in the thorax surrounding the lungs. The incidence is about 1/10000-15000 pregnancies. At diagnosis, it is usually bilateral (3/4) and associated with hydrops (2/3)

Spectrum of severity of fetal hydrothorax



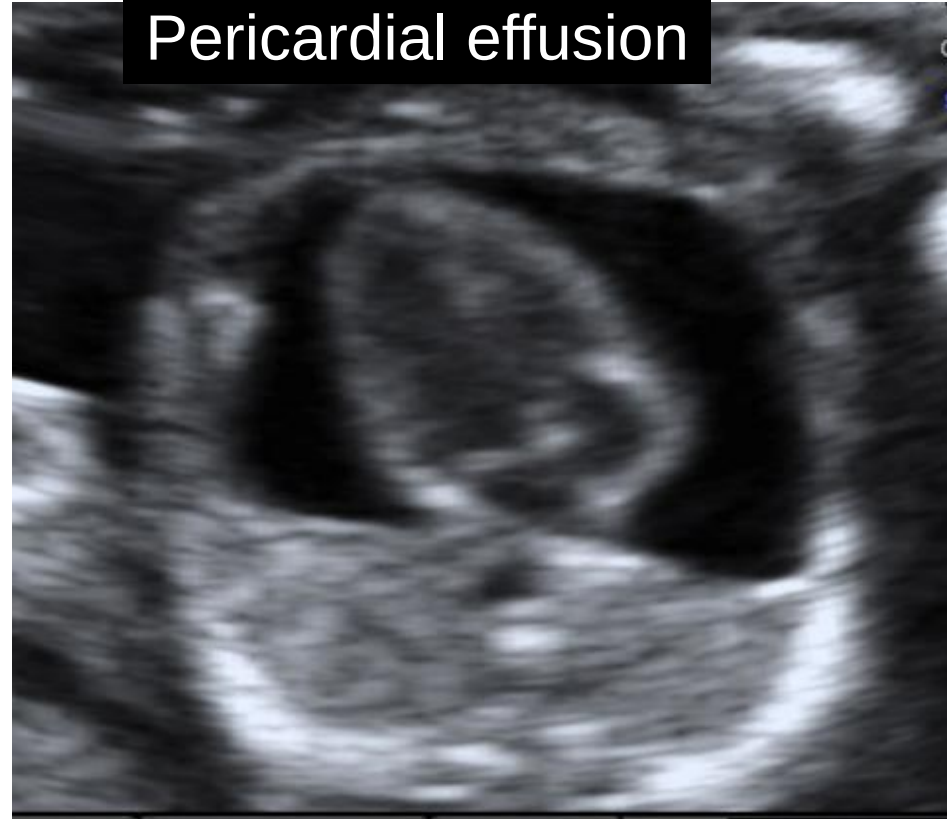
There is a very wide spectrum of presentations, from mild effusions to large collections, either unilateral or bilateral that invariably associates with hydrops. Generalized hydrops is always associated with pleural effusion. One suspects a primary hydrothorax when progression is noted from isolated hydrothorax to hydrops or when there is an obvious disproportion among the amount of pleural effusion and the fluid collections in other fetal cavities

Differential diagnosis of hydrothorax

Hydrothorax



Pericardial effusion



The main differential diagnosis is a large pericardial effusion. In the latter condition fluid accumulation do not encircle the lungs but displaces them posteriorly.

Hydrothorax (pleural effusion)

bilateral hydrothorax with
significant subcutaneous
edema (hydrops)

Clip 01



Primary hydrothorax

Same case as previous video in a coronal view of the thorax. Ascites is present, but in a minimal amount, suggesting that a primary hypertensive bilateral hydrothorax is the main cause for the hydrops



Clip 02

Unilateral hydrothorax

This video shows an unilateral left hydrothorax, with only a small rim of fluid on the right side.



Clip 03

Secondary hydrothorax in a case of generalized hydrops

The etiology of hydrothorax:

1. Primary hydrothorax or chylothorax, as an isolated finding
2. Secondary hydrothorax or associated with
 - a. thoracic mass
 - b. chromosomal anomaly
 - c. cardiac anomalies
 - d. fetal infections
 - e. hydrops

The video shows a case of hydrops in which the subcutaneous edema and the ascites components are much more prominent than the hydrothorax one. In such case, we consider the hydrothorax is most likely secondary to another hydropic process



Hydrothorax secondary to cardiac disease

Cardiac anomalies remain among the most common causes of secondary hydrothorax, usually in the context of fetal hydrops. A complete echocardiography is always warranted

The video shows a case of non-hypertensive hydrothorax with hydrops secondary to a severe cardiac anomaly: an atrioventricular septal defect with complete block, in a case in which absent inferior vena cava was also detected. A left isomerism was diagnosed. Therefore, there is no indication to treat the effusion prenatally



Clip 05

Hydrothorax secondary to cardiac disease

The video shows a case of a huge hydrothorax with hydrops secondary to a severe supraventricular tachycardia. The primary treatment is with antiarrhythmic drugs



Clip 06

Isolated hydrothorax (congenital chylothorax)

Occurs rarely (1:15000 pregnancies).
Hydrothorax results from lymphatic leakage because of disturbed development of the thoracic duct.
Diagnosis more common in 2nd and 3rd trimesters
Evolution is variable with spontaneous regression in 10-25% and an overall mortality of 35-50%
Complications include hydrops, lung compression and pulmonary hypoplasia, respiratory failure, polyhydramnios with preterm labor and delivery, perinatal death



Clip 07

Management of isolated hydrothorax



Optimal management of isolated fetal hydrothorax, is controversial since some fetuses may not be compromised, whereas others may develop hydrops or die. The options include conservative follow-up, fetal treatment (including thoracocentesis, thoracoamniotic shunt or pleurodesis), delivery (if gestational age is > 36 weeks' gestation). Termination of pregnancy may be considered if the diagnosis of a severe form is made in early gestation, particularly in those cases associated with hydrops.

Early delivery

The video shows a case of moderate bilateral hydrothorax at 36 weeks. Delivery is a reasonable option

Clip 08





Conservative management

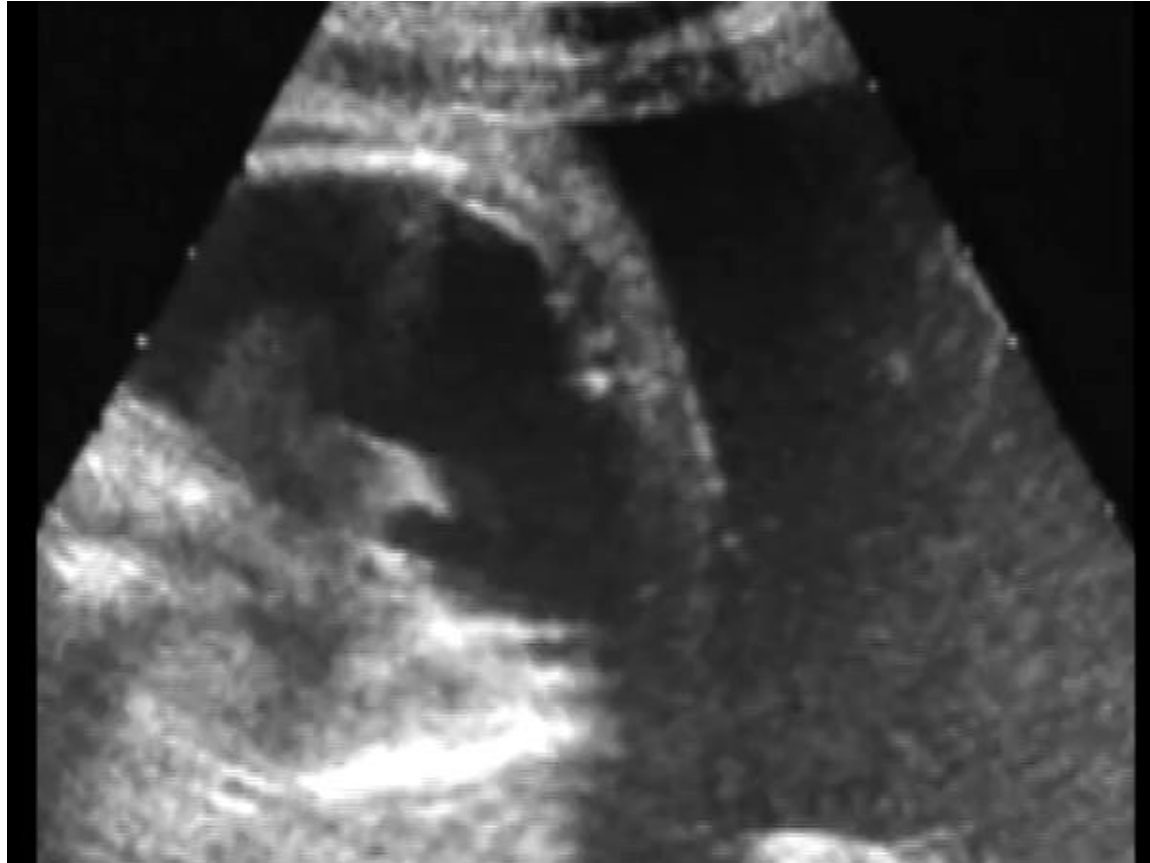


A conservative management is recommended for cases in which spontaneous resolution is possible. The following criteria are suggested: primary hydrothorax; small effusion; absence of significant mediastinal shift (non-hypertensive effusion); no hydrops or polyhydramnios. Strict follow-up is needed every 1-2 weeks, in order to detect evolution to hydrops.

The pictures show on the left a primary unilateral and on the right bilateral pleural effusions, which applied for conservative treatment. Both of them regressed spontaneously.

Fetal thoracocentesis: technique and advantages

Thoracocentesis is performed under continuous ultrasound guidance using a 20-gauge needle inserted percutaneously. The main advantages include: 1) may be resolutive; 2) $> 80\%$ lymphocyte count indicates chylothorax; 3) quick karyotype can be obtained; 4) pulmonary hypoplasia can be inferred; 5) allows for complete examination of fetal anatomy; 5) prior to delivery facilitates neonatal resuscitation



Thoracocentesis to exclude pulmonary hypoplasia

Before thoracocentesis



After



The pictures show very good expansion of the lung following thoracocentesis, which is highly suggestive of normal development of the lung and rules out pulmonary hypoplasia

Drawback of thoracocentesis

Immediately after drainage

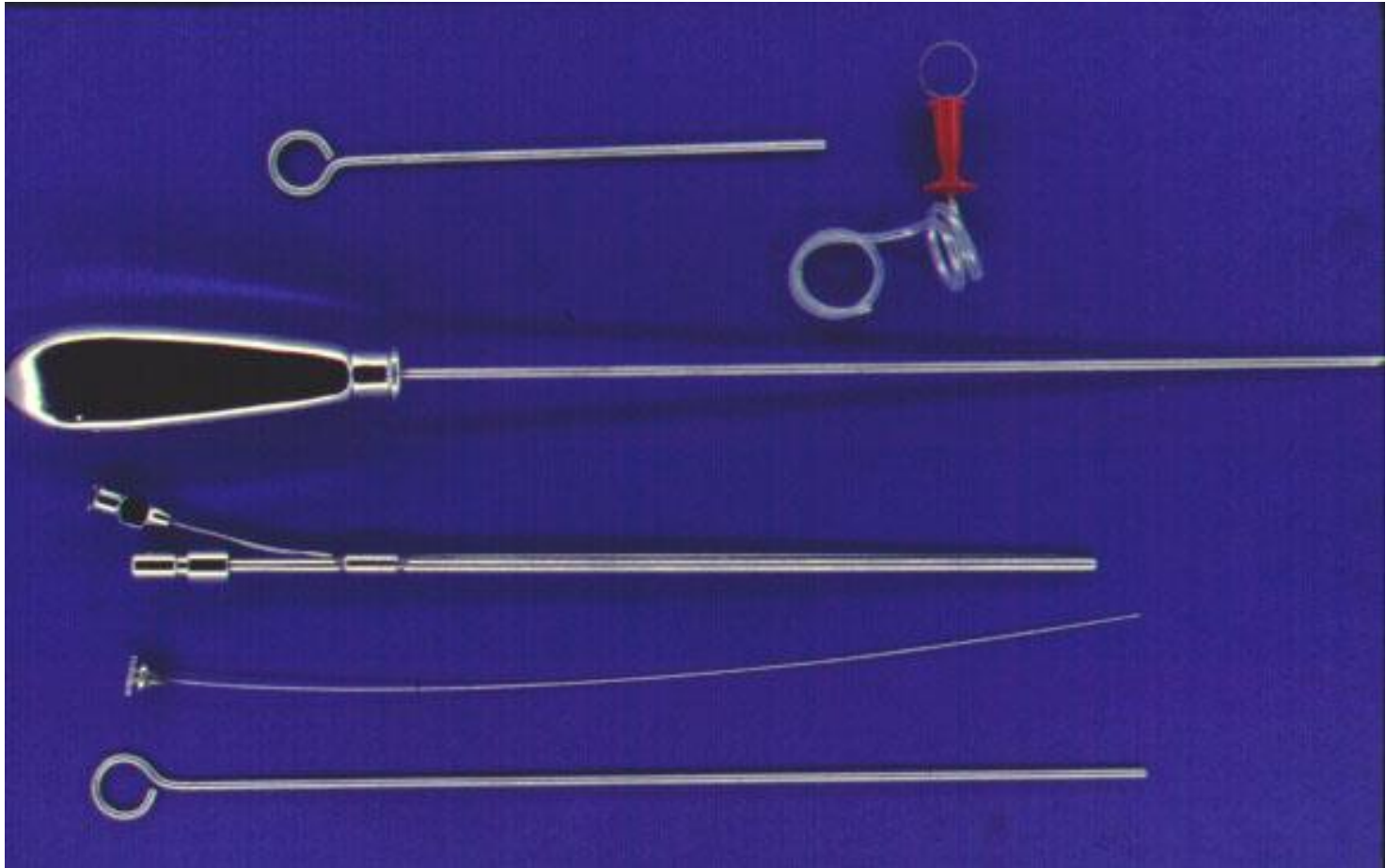


24 hours later



The main disadvantage of thoracocentesis is that in the majority of cases there is a rapid reaccumulation of the effusion within 24-48 hour

Thoracoamniotic shunting



The main goal in the management of a fetus with persistent hydrothorax is chronic drainage by the insertion of thoraco-amniotic shunts. The figure shows a commercially available shunt. The diameter of the cannula is 3 mm, through which the trocar is inserted under ultrasound guidance. Then, the trocar is removed and the double pigtail silastic catheter will be delivered with the pusher.

Thoracoamniotic shunting: technique

The video shows the insertion of the shunt into the pleural effusion through the posterior wall of the thorax.

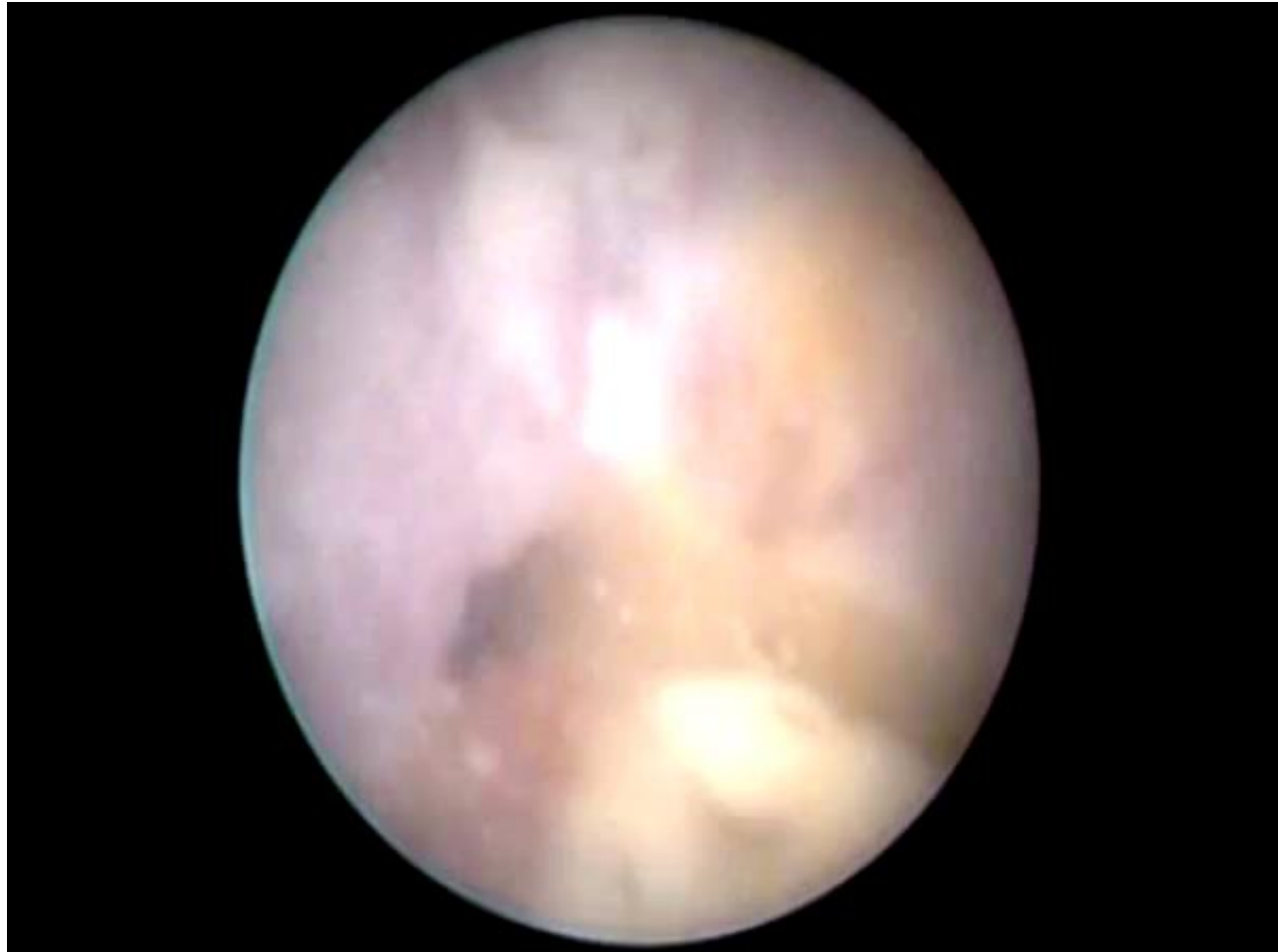


Clip 12

Thoracoamniotic shunting: technique

The video shows the fetoscopic view of the external part of the shunt coming out through the skin of the back of the fetus

Clip 13

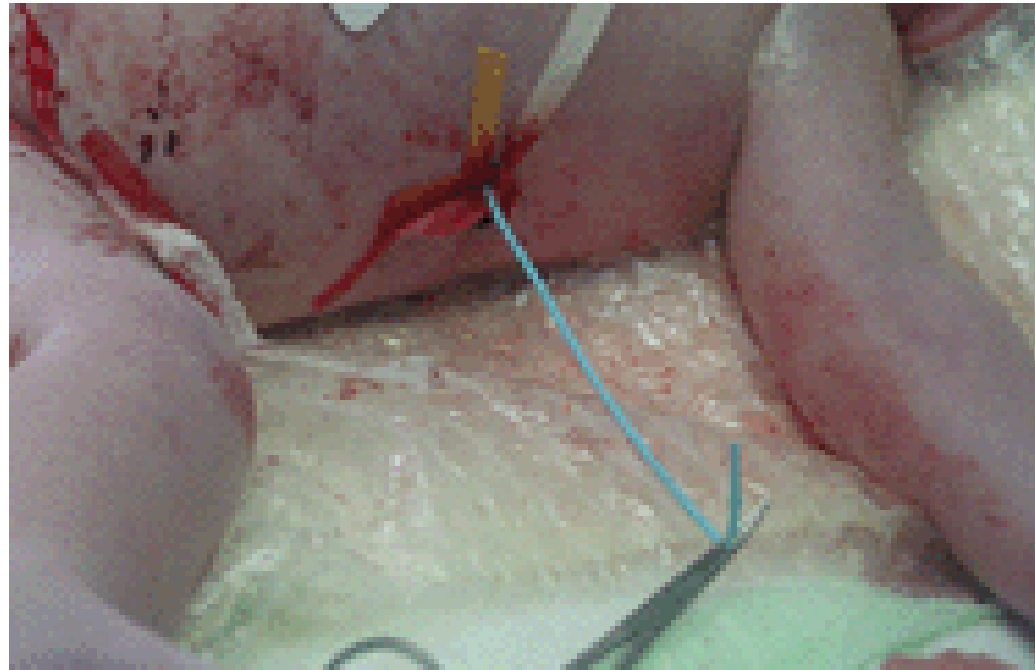


Thoracoamniotic shunting: technique



The pictures show two examples of complete expansion of the lung after shunting. The shunt is identified correctly 'in situ' with one of the tails inside the thorax and the other tail in the amniotic cavity

Thoracoamniotic shunting: complications and results



10-20% of shunts need to be repeated because of obstruction or catheter migration; 10-15% preterm premature rupture of membranes; 1% chorioamnionitis. Survival depends on the presence of hydrops: 45-65% with hydrops, 70-100% without. Postnatally, the shunt should be clamped immediately after delivery to avoid development of a pneumothorax in the newborn