ABDOMINAL ENLARGEMENT DUE TO ISOLATED ASCITES (INTRAPERITONEAL FLUID ACCUMULATION)

A. "isolated" ascites is an intraperitoneal accumulation of fluid, excluding fluid accumulations in other serous cavities and subcutaneous edema that characterize hydrops fetalis. With some exceptions, isolated ascites is usually due to a number of intraabdominal abnormalities, whereas the disorders that produce hydrops fetalis are considerably more diverse and numerous. Typical postnatal physical signs include prominent abdominal skin vessels, uniform abdominal distention, and sometimes the elicitation of a fluid wave. Occasionally ascitic fluid can be recognized only by x-ray or ultrasonography. Abdominal x-ray indicates homogeneous density throughout. When large amounts of fluid have accumulated, intestinal gas, if present, is usually clustered at the midabdomen. Ultrasonography demonstrates fluid and associated intraabdominal abnormalities. Ascites is often diagnosed in utero by ultrasound examination. A considerable amount of diagnostic data is often available before birth. Sequential ultrasound examinations in utero have revealed that isolated ascites may be a prelude to hydrops fetalis or may disappear spontaneously. When it disappears, the neonate's abdominal skin is lax and diastasis recti is obvious.

B. Abdominal paracentesis is not necessary in all cases. The pediatric surgical literature repeatedly asserts that complications are very unlikely if the procedure is properly performed and that the perforation of intestine with a small needle is self-sealing. Nevertheless, if noninvasive imaging establishes the diagnosis of small bowel obstruction or perforation, urinary tract obstruction, or meconium peritonitis, the indications for surgery preclude any need for paracentesis. Furthermore, it is difficult to envision self-sealing punctures in a tightly distended gut with an overstretched wall. However, in the absence of conclusive indications, examination of ascitic fluid is indispensable. When necrotizing enterocolitis (NEC) is progressive, fluid accumulation may require paracentesis because bowel rupture of any size may produce a significant amount of fluid (usually sanguinopurulent or dark brown) in the absence of a telltale accumulation of free peritoneal air. Dark brown fluid may also accumulate from gangrenous unperforated gut. Paracentesis is advisable when liver and spleen are enlarged, liver dysfunction has been demonstrated, and a diagnosis has not been established. Congenital nonbacterial and syphilitic infections are diagnosed by multiple modalities other than examination of ascitic fluid, but when ascites is a component of hydrops, evaluating the fluid is preferable. Ascitic fluid of CMV, toxoplasmosis, and syphilis is sometimes serosanguineous. When liver disease is present with direct hyperbilirubinemia, the fluid is deep yellow, jaundice and acholic stool associated with ascites suggest a ruptured extrahepatic biliary duct, most often at the junction of the cystic and common ducts.

C. Electrolytes, glucose, BUN, and creatinine determinations are not usually useful. These concentrations tend to be similar to serum concentrations because of equilibration of ascitic fluid with plasma.

D. Clear, pale yellow fluid is the least specific of all the gross appearances. Urinary ascites is reportedly the most common diagnosis, in such instances, urinary tract obstruction occurs at any level but most often below the ureteropelvic junction. Advanced obstructions are readily demonstrated, if not already diagnosed in utero or surmised from physical signs at birth. Generally, urea and creatinine contents are similar to serum, but a number of reports have described values higher than serum but lower than urine. An unsuccessful attempt to insert an umbilical artery catheter resulted in avulsion of the urachus from the bladder dome, direct communication of the bladder with the peritoneal space, and then massive urinary ascites. Nonpurulent infections cause isolated ascites as well as hydrops fetalis. Variable WBC counts have in common a preponderance of lymphocytes, and total protein may be elevated. Syphilis, CMV, toxoplasmosis, and hepatitis of unknown etiology have all been implicated. The mechanisms of ascites produced by lysosomal storage diseases are unknown, α-1-antitrypsin deficiency has been described to cause severe neonatal cirrhosis, portal hypertension, and isolated ascites.

E. Distinctly bilious ascitic fluid, in the absence of free peritoneal air, indicates a ruptured extrahepatic biliary duct. Affected infants are moderately jaundiced and their stools are acholic.

F. Either serosanguineous or dark brown fluid may be associated with gangrenous intestine, most commonly as a consequence of NEC and less often from small bowel obstruction, volvulus, or meconium peritonitis. Fluid from the last disorder contains meconium particles unless intrauterine bowel rupture had healed after occurring well before birth. In that circumstance, fluid is clear and green.

G. Purulent fluid is produced by ruptured bowel from any cause, most frequently from NEC and rarely in association with septicemia. Cell counts, smear for organisms, and cultures identify the etiologic agents.

H. Milky fluid is specific for chylous ascites, which is believed to be caused by abdominal lymphatic anomalies that obstruct lymph flow from the intestine. Before feeding, ascitic fluid is clear, contains a
ABDOMINAL ENCLAVEMENT DUE TO INTRAPERITONEAL FLUID

Physical examination → A Fetal ultrasound data
Abdominal x-ray and ultrasound

B Consider diagnostic paracentesis

Usually not informative:
Intestinal perforation
Small bowel obstruction
Meconium peritonitis
Urinary tract obstruction

Usually necessary:
No intestinal perforation
No small bowel obstruction
NEC and fluid accumulation
No other evident pathology
Abnormal liver function
Nonbacterial infection suspected
Apparent septicemia
Lysosomal storage disease suspected
Jaundice and acholic stool

Aspirate 10–20 ml of fluid for Diagnoses

C Usual laboratory studies:
Cell counts
Total protein
Albumin
Bacterial culture
Viral culture
Smear for organisms
Triglycerides (if milky)

Assess gross appearance of fluid
(Cont’d on p 95)
moderate number of lymphocytes, and is low in protein. The typical chylous appearance follows feedings and subsequently clears when feedings are discontinued. Chylous fluid contains higher concentrations of triglyceride than serum. If fluid was aspirated during intravenous lipid administration, serum and fluid triglyceride concentrations are virtually equal.

SBK

References
Assess gross appearance of fluid

D Clear, pale yellow
E Clear, bilious
F Sanguinous, dark brown
G Purulent
H Milky

Chylous ascites
Medium-chain triglyceride feeding formula
Continuous drainage or repeated aspiration

Ruptured extrahepatic bile duct
Gangrenous gut: Small bowel obstruction
Neonatal enterocolitis (NEC)
Mesencephalic encephalitis
Ruptured ovarian cyst
Surgery consultation

Urinary ascites:
- Postrenal valves
- Bladder rupture
- Urethral atresia
- Ureteral obstruction
- Hydronephrosis
- Umbilical catheter trauma

Nonpurulent infection:
- CMV
- Syphilis
- Toxoplasmosis
- Hepatitis

Portal hypertension
Prenatal or postnatal
Diagnosed by serology and cultures

Metabolic disease:
- Salla disease
- G6-PD deficiency
- GM1 gangliosidosis
- Sialidosis
- α-1-Antitrypsin deficiency (PiZZ)

Specific enzyme determinations necessary; often associated with abnormal facies, bone x-rays