FIGURE 2. A 5-year-old girl with infected pancreatic necrosis. Axial image from a CT performed with intravenous contrast material shows gas locules in the nonenhancing pancreas (arrows). No normal pancreas is visible and acute fluid is present in the abdomen. The patient also had acute renal cortical necrosis accounting for absent enhancement of the renal cortex. CT = computed tomography.

CT severity scoring indices (eg, CT severity index [CTSI], Balthazar score) were established in adult populations, but more recently have been applied to children (15,65). Similar to adult studies, the CTSI has been shown to be a better predictor of the severity of AP compared with clinical scores in children (65–67). A recent pediatric study applying the CTSI scores in 211 children with AP found the sensitivity and specificity of the CTSI in predicting a severe course of AP to be 81% and 76%, respectively, with positive-predictive and negative-predictive values of 62% and 90%, respectively (68). In this same pediatric cohort, the presence of necrosis in AP was associated with higher rate of major complications (68).

Magnetic Resonance Imaging/Magnetic Resonance Cholangiopancreatography

Studies are lacking regarding the diagnostic performance of MRI in diagnosing AP in children, particularly compared with other imaging modalities. MRI can be used for assessment of AP, but because of the need for long periods of holding still may not be suitable for children, especially if critically ill. MRI may contribute to confirmation of an attack of AP or to identification/confirmation of acute duct obstruction (see below) but pancreatic edema because of an acute episode of pancreatitis can obscure pancreatic duct anomalies that may be relevant to the cause of pancreatitis.

The greater soft tissue contrast of MRI (vs CT) is advantageous when assessing the pancreatic parenchyma and biliary and pancreatic ducts and when characterizing fluid collections (22). Adult data suggest that MRI is more sensitive than CT for findings of AP including edema and hemorrhage with up to 15% to 30% of patients with a normal CT showing findings of AP on MRI (69–71). Adult data have also shown the diagnostic performance of MRI to be as good as CT for pancreatic necrosis (72).

MRI, particularly MRCP, has also been shown to be more sensitive than CT for biliary etiologies of pancreatitis (20). Specifically, in adults, MRCP has up to 100% sensitivity for pancreatic and biliary duct stones greater than 3 mm in size (73). MRCP can be particularly useful in the evaluation of choledocholithiasis when biliary duct dilatation is found on ultrasound without stone(s) visible in the duct(s) (74–78). Structural abnormalities of the pancreatic duct and parenchyma, such as pancreas divisum and an abnormal union of the pancreaticobiliary junction with a long common channel have also been associated with acute pancreatitis (79), and MRCP is the optimal noninvasive imaging modality for these entities.

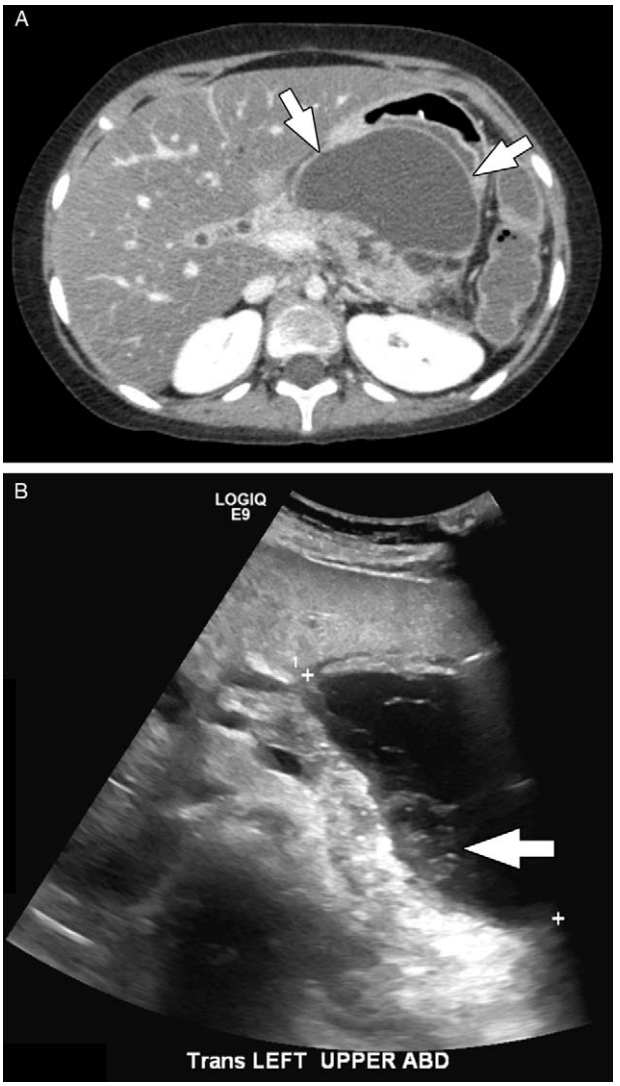

FIGURE 3. A 10-year-old girl with walled off pancreatic and peripancreatic necrosis. (A) Axial image from a CT performed with intravenous contrast material shows a walled off collection involving the body of the pancreas and the peripancreatic tissues in the lesser sac (arrows). Note how the content of the collection appears relatively simple by CT. (B) Transverse image from a transabdominal ultrasound performed the next day shows the same collection but with layering solid/semi-solid debris (arrow). CT = computed tomography.

MRI can help distinguish acute necrotic collections from acute peripancreatic fluid collections by identifying and characterizing the internal content of these collections (50). MRI is also superior to CT in detecting hemorrhage, which can be a complication of necrosis (80) (Fig. 4). In clinical practice, MRI is often used for assessment and monitoring of late complications of AP, such as