Mucinous cystic neoplasm of the pancreas during pregnancy: the importance of proper management

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Abstract
We describe a case of huge mucinous cystic tumor of the pancreas in a 26-year-old woman during pregnancy. Ultrasonography demonstrated a well-delimited cystic mass in the left upper abdominal quadrant, suggestive of benignity. Magnetic resonance imaging showed a large cystic mass resembling a mucinous cystic tumor of the pancreas. After this assessment the patient underwent surgical exploration and a huge cystic tumor of the pancreas was discovered. The tumor was enucleated and distal pancreatectomy was performed. The resected margin of the specimen was free of tumor. In this case report we discuss the management of mucinous pancreatic tumors during pregnancy and we briefly review the previously reported cases of mucinous pancreatic tumors in pregnant patients. We conclude that surgical resection of these tumors should be strongly considered in pregnancy. Removal of the tumor appears to be a safe procedure without harmful effects to the fetus.

Key words Pancreatic tumor · Mucinous cystic tumor · Pregnancy

Introduction
Cystic tumors of the pancreas account for 5% of pancreatic neoplasms. Mucinous tumor (MT) of the pancreas is more common in women and behaves in a manner very similar to cystadenoma in the liver and cystadenoma in the ovary. MTs are likely to be the most commonly recognized entity of all the unusual tumors in the pancreas.

MT is extremely rare in young patients and is particularly rare during pregnancy. Only a few cases occurring during pregnancy have been reported in the English-language literature.

These tumors are often found incidentally and occasionally may cause symptoms. They are typically localized in the body and tail of the pancreas and therefore are rarely associated with jaundice. Also, MTs are frequently confused with pancreatic pseudocysts.

We present a case report of a 26-year-old-patient, in the twentieth week of gestation, with a mucinous cystic tumor located in the tail of the pancreas.

Case report
A 26-year-old female patient (primigravida) in the twentieth week of pregnancy was referred to our service because a huge cystic mass was found during abdominal ultrasound performed for recurrent upper abdominal pain and hyperemesis. She had no notable medical history and had complained of recurrent episodes of epigastric pain during the past 1 year; these episodes had resolved spontaneously.

The patient was admitted to our service for further evaluation. Abdominal examination revealed a prominent mass in the left hypochondrium; laboratory test results were unremarkable and failed to show evidence of acute pancreatitis complicated by pseudocyst. Amylase and lipase levels were normal. She had a white blood cell count of $10.5 \times 10^9$/l, platelet count of $263 \times 10^9$/l, and hemoglobin level of 12.1 g/dl.

Ultrasonography revealed the presence of a 15-cm cystic mass, of doubtful origin, in the left upper quadrant of the abdomen. Computer tomography (CT) scanning was not considered for further evaluation because she was pregnant.

Magnetic resonance imaging of the abdomen and pelvis showed a huge cystic mass in the left hypochondrium, approximately $14 \times 10 \times 14$ cm, surrounded by thick walls (Fig. 1). The mass showed a 1.5 cm solid component, and there were minor irregularities inside the cyst mass (Fig. 2).
A diagnosis of suspicious pancreatic cystic tumor was made. She was advised of possible restriction, of fetal intrauterine growth by the tumor and of the premalignant nature of the tumor. Then, the patient expressed her desire to preserve her pregnancy. A decision was made to resect the tumor after she received further information.

On operative resection, a large cystic mass of the pancreatic tail was found. Enucleation of the tumor was feasible, but we decided to resect the distal pancreatic tail with splenic preservation because the cystic tumor was considered to be a premalignant lesion. The patient underwent curative resection with an uneventful recovery. Four years after the intervention, mother and child are in good health.

Pathological analysis confirmed a final diagnosis of mucinous cystic neoplasm of pancreas with a tumor-free margin and nonaffected lymph nodes. The specimen measured $12 \times 14 \times 15$ cm, and was a yellowish well-delimited cystic mass with a smooth surface. The specimen was filled with mucoid material. Sections of the cystic mass displayed a large cystic lesion with a few additional smaller cystic spaces and a less important solid component. The cysts were lined with a mucinous, cylindrical type of epithelium, with tall cells (Fig. 3). They showed ovarian-type stroma without germinal follicles (Fig. 4). No atypia or abnormal mitotic activity was noted, and there was no evidence of invasion with stromal reaction.

**Discussion**

As far as we know, our patient represents the fourth case reported in the English-language literature of a successful antepartum resection of a mucinous cystic tumor of the pancreas in the second trimester of pregnancy.

Olsen et al.\(^1\) reported the first case in 1993, and the second case was reported by Ganepola et al.\(^2\) in 1999. Both cases resulted in the survival of both mother and infant.

Recently, Kato et al.\(^3\) reported a new case (third) in a patient in the twenty-third week of pregnancy, with successful results after resection.

In our patient, surgical resection prevented the restriction of intrauterine growth of the fetus, and progression of the tumor. Also, the resection helped to alleviate symptoms caused by the tumor.

Cystic tumors in the pancreas often grow very slowly and can remain indolent for many years. They tend not to infiltrate into adjacent structures. However, in most of the reported cases, rapid growth of these tumors was reported during pregnancy, as a hormonally responsive tumor.\(^2,5\) In the patient reported by Kato et al.\(^3\), the tumor rapidly increased in volume over 46 days, compressed the fetus in the abdomen, and showed tumor cells that were positive for hormone receptors.

In our patient, immunohistochemical studies for estrogen and progesterone receptors in the final specimen were not done, but the case in our patient may represent another premalignant mucinous cystic tumor with rapid growth.