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CLINICAL ARTICLE

A 23-year, single-center, retrospective analysis of 36 cases of acute pancreatitis in pregnancy

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ABSTRACT

Objective: To assess the incidence, causes, clinical characteristics, and outcomes of cases of acute pancreatitis in pregnancy (APIP). *Methods:* A retrospective review was conducted of the medical records of pregnant women who were diagnosed with APIP at any point during pregnancy, labor, or the puerperium and attended Beijing Chaoyang Hospital, China, between January 1, 1991, and March 31, 2014. *Results:* Among 34 292 pregnant women admitted to the center during the study period, 36 patients were diagnosed with APIP. The condition developed during the second (9 [25%] cases) and third (22 [61%]) trimesters. The underlying cause was hypertriglyceridemia for 14 (39%) patients and biliary diseases for 7 (19%). Severe acute pancreatitis was significantly more common among patients with hypertriglyceridemia (11/14 [79%]) than among those without hypertriglyceridemia (6/22 [27%]; $P = 0.006$). Additionally, complications were recorded for more patients with hypertriglyceridemia (11 [79%]) than those without hypertriglyceridemia (4 [18%]; $P < 0.001$). Delayed diagnosis was more common among patients with severe acute pancreatitis (8/17 [47%]) than among those with mild acute pancreatitis (3/19 [16%]; $P = 0.039$). No maternal deaths and only two perinatal deaths were recorded. *Conclusion:* The overall incidence of APIP was low; however, hypertriglyceridemia was associated with poor outcomes. Early diagnosis and prompt treatment should be implemented to improve maternal and fetal prognosis and decrease mortality.

1. Introduction

Acute pancreatitis in pregnancy (APIP) has a rapid onset and is complicated by rapid progression, frequent misdiagnosis, high mortality, and serious threats to maternal and fetal safety. It is a rare disease, with an incidence of approximately one per 1000–12 000 pregnancies [1–4]. Variation in incidence is attributed to age, diet, alcohol consumption, and genetic variation [5]. Because of its rarity, the number of cases included in most published studies tends to be small.

However, the incidence of APIP might have increased during the past four decades. The rate recorded in Scotland, UK, increased from 9.4 per 100 000 pregnancies during the period 1968–1980 to 41.9 per 100 000 pregnancies in 1995 [6]. Furthermore, the incidence of APIP can vary substantially owing to the different incidence of its main causes between ethnic groups, such as gallstones [4].

Few published studies on APIP have been from China. Given the uncertainty surrounding the incidence, management, and outcomes of APIP among patients in China, it has been proposed that efforts should be made to conduct studies with large numbers of cases. In addition, prompt diagnosis and suitable treatment of APIP are essential to ensuring a good prognosis. The aim of the present study was to evaluate the incidence, causes, clinical features, management, and outcomes of all cases of APIP identified at one center in China during a 23-year period to gain more knowledge of this disease.

2. Materials and methods

A retrospective review was conducted of the medical records of pregnant women who attended Beijing Chaoyang Hospital, Beijing, China, between January 1, 1991, and March 31, 2014. Patients were included in the present analysis if a diagnosis of APIP had been established at any point during pregnancy, labor, or puerperium. The condition was diagnosed and classified as either mild acute pancreatitis (MAP) or severe acute pancreatitis (SAP) according to the Atlantic Criteria [7]. Diagnosis required at least two of the following clinical features: upper abdominal pain of acute onset, usually radiating to the back; increased levels of serum amylase or lipase (greater than three times the normal levels [172 U/L for amylase and 110 U/L for lipase]); and findings on abdominal imaging consistent with acute pancreatitis. Patients with chronic pancreatitis were excluded. The present study was approved by the institutional review board of Beijing Chaoyang Hospital. Patient records and data were anonymized and de-identified before analysis, so informed consent was not required.

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Information was collected from the patients' medical records regarding maternal age, gestational age at presentation and delivery, potential cause of APIP, clinical manifestations and complications, diagnostic testing, clinical management, and maternal and fetal outcomes. The data were analyzed using SPSS version 17.0 (SPSS Inc, Chicago, IL, USA). Binary data were presented as number and percentage. Demographics were recorded as categorical data. Differences in proportions were compared using the Fisher test. $P < 0.05$ was considered statistically significant.

3. Results

During the study period, 34 292 pregnant women were admitted to the study center, and 36 cases of APIP were identified from the medical records. However, seven women had been diagnosed with APIP at affiliate hospitals and were transferred to Beijing Chaoyang Hospital. Consequently, the incidence of APIP at the study center was estimated to be was 29 per 34 285 pregnancies (1 per 1182). Most cases of APIP occurred in either the second (9 [25%] cases) or third (22 [61%]) trimester. The remaining five cases occurred in the first trimester (2 [6%]), during labor (1 [3%]), or in the puerperium (2 [6%]).

The underlying cause of APIP was hypertriglyceridemia (triglyceride level ≥11.3 mmol/L) for 14 (39%) patients and biliary diseases for 7 (19%). Other causes were pre-eclampsia (3 [8%] patients), gestational diabetes mellitus (2 [6%]), gestational impaired glucose tolerance (1 [3%]), hyperemesis gravidarum (1 [3%]), ischemia reperfusion injury (1 [3%]), intravenous infusion of erythromycin (1 [3%]), and labor (1 [3%]). Five (14%) patients had idiopathic APIP.

Among the 14 patients with hypertriglyceridemia, 11 (79%) developed SAP and 3 (21%) developed MAP. Conversely, among the 22 patients without hypertriglyceridemia, 6 (27%) developed SAP and 16 (73%) developed MAP. The observed between-group difference in the incidence of SAP was statistically significant ($P = 0.006$), which suggested that hypertriglyceridemia-induced APIP tended to be associated with a severe clinical manifestation.

The most frequent presentations of APIP were abdominal pain (35 [96%] patients), nausea and vomiting (31 [86%]), and fever (29 [81%]). Other recorded symptoms included anorexia (10 [28%] cases), jaundice (5 [14%]), and diarrhea (2 [6%]). Overall, 15 (88%) of the 17 patients with SAP developed serious complications, including paralytic ileus, pneumonia, electrolyte disturbance, diffused purulent peritonitis, pleural effusion, multiple organ dysfunction syndrome, gastrointestinal bleeding, pseudocyst, pancreatic abscess, and femoral vein thrombosis. Complications were recorded for 11 (79%) of the patients with hypertriglyceridemia, compared with only 4 (18%) of the 22 patients without hypertriglyceridemia ($P < 0.001$).

Elevated white blood cell count, hyperglycemia, severe hypocalcemia, and hypertriglyceridemia were found more frequently among patients with SAP than among those with MAP ($P < 0.05$ for all) (Table 1). Increased amylase and/or trypsinogen-2 activity was detected in the urine of all patients (data not shown).

Table 1
Blood test results (n = 36).[a]

Measure	Severe acute pancreatitis (n = 17)	Mild acute pancreatitis (n = 19)	*P* value[b]
Amylase level >172 U/L	16 (94)	18 (95)	0.513
White blood cell count $>10^{10}$ per L	15 (88)	10 (53)	0.021
Hyperglycemia[c]	15 (88)	3 (16)	<0.001
Severe hypocalcemia[d]	14 (82)	1 (5)	<0.001
Hypertriglyceridemia[e]	11 (65)	3 (16)	0.006

[a] Values given as number (percentage), unless indicated otherwise.
[b] Fisher test.
[c] Fasting plasma glucose ≥7.8 mmol/L.
[d] Serum calcium level <1.87 mmol/L.
[e] Serum triglyceride level ≥11.3 mmol/L.

Transabdominal ultrasonography was performed among 29 (81%) patients; 19 were diagnosed with APIP, four with cholecystolithiasis, one with cholestasis, and one with cholecystitis. No abnormalities were detected among the remaining four patients, all of whom later underwent computed tomography (CT). Overall, 16 (44%) patients underwent CT; APIP was identified among 15, 11 of whom had SAP and four had MAP.

Delayed diagnosis was significantly more likely among patients with SAP than among patients with MAP ($P = 0.039$) (Table 2). Reasons for delayed diagnosis included misdiagnosis as appendicitis, threatened labor, acute gastroenteritis, and patient delay in going to the hospital.

Conservative treatment of APIP included fasting, gastrointestinal decompression, parenteral nutrition, low-fat enteral nutrition, supplemental oxygen, fluid resuscitation, supplemental electrolytes, acid inhibitors, antibiotics, and trypsin inhibitors. Acid-inhibiting drugs and antibiotics were administered to all 36 patients. A trypsin inhibitor was administered to 24 (67%) patients, including all 17 diagnosed with SAP. Calcium gluconate was administered to the 15 patients with severe hypocalcemia. Insulin was used to normalize glucose levels among the 18 patients with hyperglycemia. Some of the patients with SAP received additional treatments: 6 (35%) received percutaneous peripancreatic drainage, 4 (24%) had plasma exchange, and 4 (24%) underwent mechanical ventilation. Two (12%) of the patients with SAP underwent exploratory laparotomy and cholecystectomy.

Overall, 21 (58%) women underwent cesarean delivery. No maternal deaths occurred during the present study period; however, 6 (17%) patients—all of whom had SAP—experienced fetal loss. The frequency of fetal loss decreased as length of pregnancy increased (Table 3). Perinatal death was experienced by 1 woman with SAP who had a twin pregnancy (Table 3). She underwent emergency cesarean delivery owing to worsening of her APIP.

Most of the live births (16/30 [53%]) were delivered at term. The remaining 14 live births were premature owing to the need for emergency cesareans. Three (21%) premature neonates were diagnosed with mild asphyxia. One woman developed APIP during labor; she delivered a healthy neonate vaginally and the 1-minute and 5-minute Apgar scores were 9 and 10, respectively. No fetal malformations were observed.

4. Discussion

The present study aimed to gain an understanding of factors influencing APIP in China. The incidence of this condition recorded at Beijing Chaoyang Hospital was one per 1182 pregnancies, a rate in line with previous reports that quote a large range of incidences [1–4]. Diagnosis of APIP was predominantly made during the second and third trimesters, which is consistent with the finding that the frequency of APIP increases as pregnancy progresses [8]. No maternal deaths occurred in the present study and perinatal mortality was low. This observation was in agreement with previous work on maternal and fetal mortalities [3,8,9]. One study credited the decrease in the numbers of maternal and fetal deaths to early diagnosis of APIP and improvements in maternal and neonatal intensive care [9].

Hypertriglyceridemia was the most frequent cause of APIP. During pregnancy, cholesterol and triglyceride levels increase to a different degree because of alterations in hormone concentrations [10]. Hypercholesterolemia alone does not lead to acute pancreatitis in people [11].

Table 2
Timing of diagnosis.[a]

Timing of diagnosis	Severe acute pancreatitis (n = 17)	Mild acute pancreatitis (n = 19)	Total cohort (n = 36)
Early[b]	9 (53)	16 (84)	25 (69)
Delayed[c]	8 (47)[d]	3 (16)[d]	11 (31)

[a] Values given as number (percentage).
[b] Diagnosed within 24 hours from onset.
[c] Diagnosed after 24 hours.
[d] $P = 0.039$ (Fisher test).