



Divided PE and HDF Saved a Patient with Acute Pancreatitis Caused by Hyperlipidemia in the Final Stage of Gestation

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Abstract

Acute pancreatitis is rare during pregnancy with hyperlipidemia found in only about 100 cases reported in Japan. We used divided plasma exchange (PE) and hemodia-filtration (HDF) for treatment.

A 28-year-old pregnant woman was examined at 29 weeks of gestation. Laboratory data on admission revealed an increased white blood cell count of 16,300/mm³, total cholesterol 1,072mg/dl, triglycerides 4,288mg/dl, serum amylase 850IU/L, elastase 1,002ng/dL, and phospholipase A2 2,850ng/dL. The acute pancreatitis diagnosis with CT evaluation was grade IV. In addition, the Acute physiology and chronic health evaluation (APACHE) II score was 14 points, Sequential organ failure assessment (SOFA) score 7 points, Ranson score 4 points. First, we performed PE and HDF, but filtration was impossible due to hyperlipidemia. Subsequently, we succeeded with our new method, divided PE and HDF. The patient was discharged from the hospital on the 17th hospital day. Both the patient and her baby are in good health. This is the first report of a new therapy for acute pancreatitis during pregnancy with hyperlipidemia. The experience of this case and a review of the English literature suggested that divided PE and HDF are recommended to treat this rare hyperlipidemia.

Key words: acute pancreatitis, hyperlipidemia, gestation

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Introduction

Pancreatitis complicating pregnancy is uncommon, so most obstetricians have limited experience of managing such patients. The incidence varies from 1/1,066 to 1/2,888 of deliveries. Although pregnancy, especially in nulliparous women, was once regarded as a specific predisposing condition for pancreatitis, this concept was later rejected. In nonpregnant patients, gallstones and alcohol abuse are almost equal contributors to 80% of pancreatitis cases, whereas 10% are from a long list of causes and 10% are idiopathic.

There have been about 100 reports of pancreatitis complicating pregnancy in Japan. In addition, in prior reports, maternal and perinatal mortality rates of 20% to 50% were described. In this report, we describe a case of acute pancreatitis complicated by hyperlipidemia that occurred during the final stage of pregnancy, and we recommend our new method, divided PE and HDF, if filtration is impossible due to hyperlipidemia.

Case Presentation

The patient was a 28-year-old woman, gravid 2nd. She developed hyperlipidemia, as had her mother. The patient complained of nausea and abdominal pain in the 29th week of gestation. The pain gradually increased in the epigastric region. Laboratory examination showed abnormal levels of serum amylase 850 IU/L, total cholesterol 1,072mg/dL, HDL-cholesterol 21mg/dL, triglycerides 4,288mg/dL, elastase 1,002ng/dL, phospholipase A2 2,850ng/dL, calcium 6.9mg/dL, WBC 16,300/mm³, CRP 2.03mg/dl, PT 60%, AT-III 61% with normal AST, ALT, LDH, ALP, BUN, Cr, Hb, PLT and glucose (Table 1).

The diagnosis was acute pancreatitis complicated

Table 1 Laboratory data on admission

TP	5.2 g/dl	T-bil	0.3 mg/dl
Alb	3.4 g/dl	FBS	126 mg/dl
CK	103 IU/L	CRP	2.03 mg/dl
AST	<5 IU/L	WBC	16,300 / μ l
ALT	13 IU/L	RBC	398 $\times 10^4$ / μ l
LDH	202 IU/L	Hb	14.0 g/dl
ALP	217 IU/L	HCT	35.4 %
γ -GTP	14 IU/L	Plt	24.2 $\times 10^4$ / μ l
AMY	850 IU/L	PT	full limits
Cr	0.54 mg/dl	APTT	full limits
BUN	6.3 mg/dl	FDP	4.8 μ g/ml
TG	4,288 mg/dl	pH	7.35
T-cho	1,072 mg/dl	pO ₂	93 mmHg
Na	121 mEq/L	pCO ₂	23 mmHg
K	3.5 mEq/L	cHCO ₃ ⁻	12.4 mmol/L
Cl	90 mEq/L	cBase	-11.2 mmol/L
Ca	6.9 mEq/L		



Fig. 2 Noncontrast CT showed the fetus in utero.

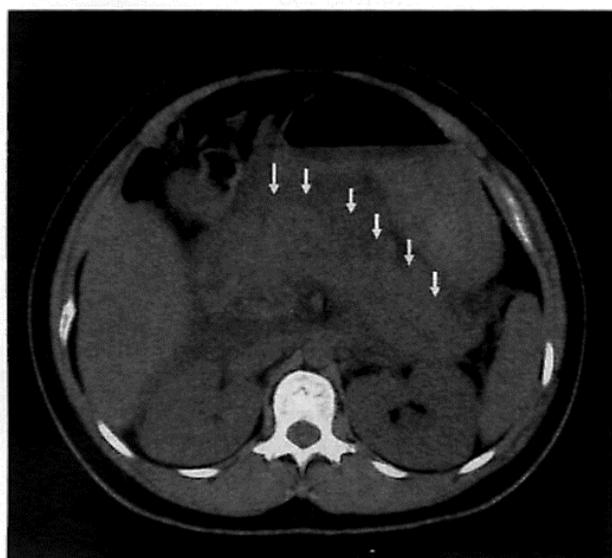


Fig. 1 Noncontrast CT showed peripancreatic inflammation from head to tail and fluid collection (arrow head).

by hyperlipidemia. On admission, her blood pressure was 120/80 mmHg and her pulse was regular at 120 beats/min. Her consciousness was 2-2-6 on the Glasgow coma scale. In addition, the severity score of pancreatitis was 9 points and CT grade IV (Fig. 1, 2). The APACH II score was 14 points, SOFA score 7 points, and Ranson score 4 points.

The patient was intubated and treated in the intensive care unit (ICU) of our hospital. We implanted an infusion catheter for continuous arterial infusion (CAI) of a protease inhibitor and imipenem · cilastatin sodium for acute pancreatitis.

The infusion catheter was placed into the gas-

trointestinal artery via a femoral artery approach. In addition, we infused a vascular access system (VAS) and performed plasma exchange (PE) and hemodiafiltration (HDF) (Fig. 3), but initially we could not perform PE and HDF because her hyperlipidemia blocked the column filtration. We tried to repeat PE and HDF using dialysis liquid for preload purification (Fig. 4), but they could not be completed due to a blocked column; therefore, blood and plasma were separated, the blood cells were returned, and plasma was transfused (Fig. 5). As a result, the patient gradually improved and was discharged from the hospital on the 17th hospital day. Both the patient and her baby are in good health (Fig. 6).

Discussion

Acute pancreatitis can be caused by various factors such as alcohol, drugs, cholelithiasis, hyperparathyroidism, and hyperlipidemia. The onset of acute pancreatitis during pregnancy is rare, with an estimated incidence of 0.03% in Japan. Less than 10% of all cases of acute pancreatitis occurring during pregnancy are associated with cholelithiasis, while in Europe and North America, cholelithiasis is found in about 50% of cases¹⁻³⁾. Several theories have been proposed to explain the mechanism of acute pancreatitis during pregnancy. Abdominal pressure due to pregnancy may constrict the duodenal mucosa, biliary tract, and the sphincter of the Oddi muscle, resulting in bile retention. On the other hand, hyper-

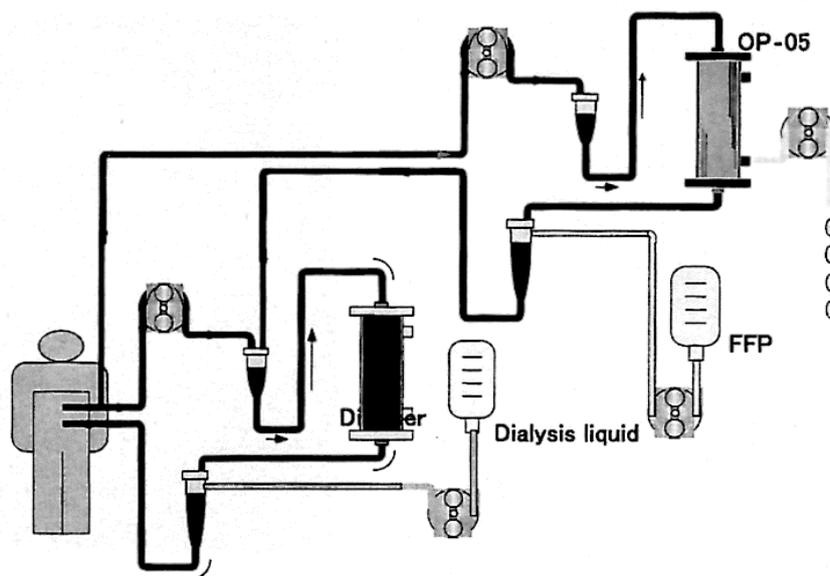


Fig. 3 The normal process of PE and HDF.

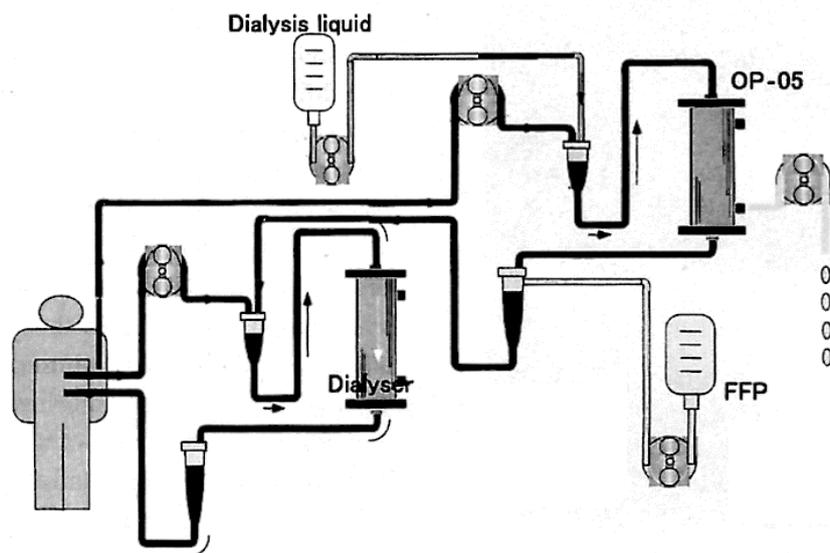


Fig. 4 Another process of PE and HDF using pre-load dialysis liquid.

lipidemia may be induced physiologically in pregnant women; plasma lipid levels begin to rise from the third month of pregnancy, reaching peak levels in the 33rd week. Yoshioka and Eguchi⁴⁾ reported that hyperlipidemia occurs in 31.3% of pregnant women during the final stage of pregnancy, with serum cholesterol levels 0.5 to 1.5 times higher and serum triglyceride levels 1.5 to 2.5 times higher than the respective values in non-pregnant women.

In our case, in the 29th week of gestation, laboratory examination showed very high levels of serum amylase 850 IU/L, total cholesterol 1,072mg/dl, and triglycerides 4,288mg/dl.

Wilkinson⁵⁾ reported maternal mortality of 37%

and fetal mortality of 37.9% in pregnancy complicated by pancreatitis. Acute pancreatitis in pregnancy is therefore more dangerous to the fetus than the mother. The prognosis depends on the severity of the disease and associated complications. As pre-term labor may occur in as many as 60% of patients with pancreatitis in late pregnancy, gestation age is a primary determinant of prenatal outcome.

Therefore, the development of rapid enzyme assays leading to earlier diagnosis and improvement in both supportive and intensive care have no doubt also played a role in this decline in mortality.

Usually, blood purification for pancreatitis is performed by peritoneal perfusion and dialysis because

PE and HDF saved a patient with acute pancreatitis

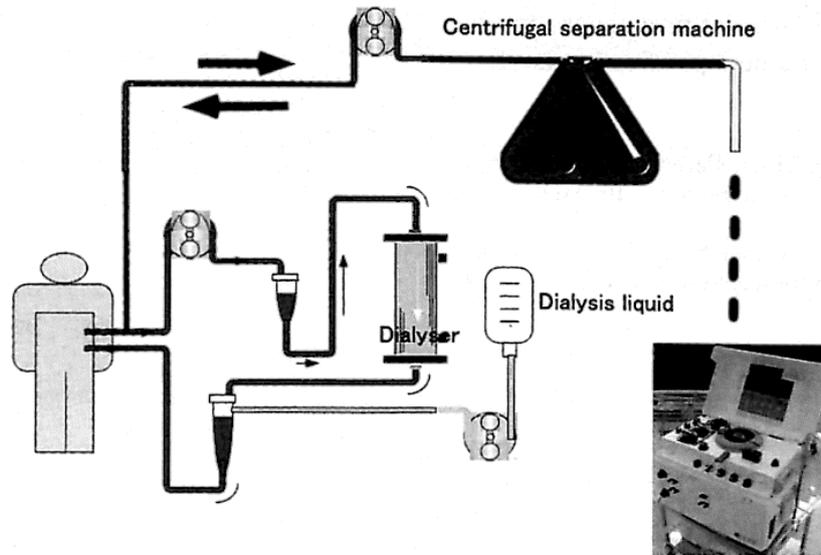


Fig. 5 Our new method of PE and HDF which uses centrifugal separation.

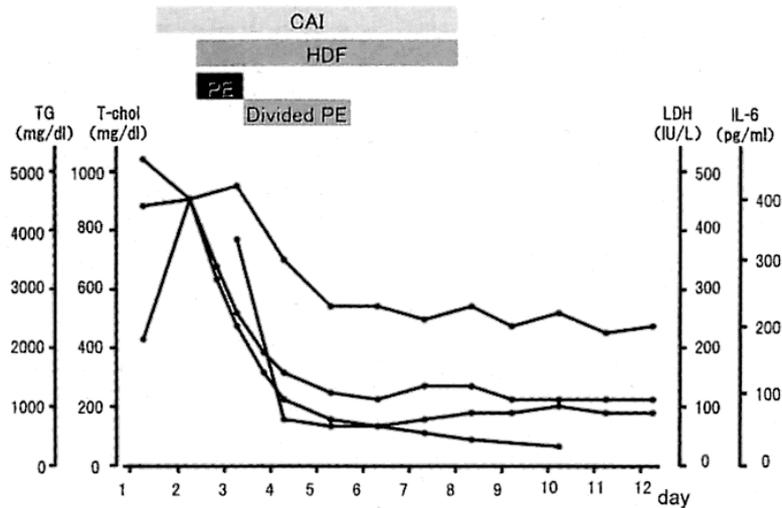


Fig. 6 Changes in the TG, T-cho, LDH and IL-6 levels during clinical course.

these techniques can directly remove pancreatic enzymes and humoral mediators such as cytokines from ascites, peritoneal macrophages primed by these factors, and necrotic debris present in the abdominal cavity.

In addition, HDF can efficiently remove from the blood most factors causing pancreatitis, such as enzymes released from the pancreas, for example, phospholipase A2 and trypsin, cytokines, and humoral mediators.

Therefore, one drawback of continuous hemodiafiltration (CHDF) is the risk of hemorrhagic complications due to anticoagulation. These complications indicate gastrointestinal bleeding and recurrent

hemorrhage, but HDF has less risk of hemorrhage than CHDF.

Our new method, divided PE and HDF, was performed because the HDF filtration column was blocked due to hyperlipidemia. Blood and plasma were separated by centrifugal separation, the blood cells were returned and plasma was transfused. As a result, HDF could remove phospholipase A2, trypsin, cytokines and humoral mediators.

The patient was discharged from the hospital on the 17th hospital day. Both the patient and her baby are in good health.

In this report, we described a case of acute pancreatitis complicated by hyperlipidemia that oc-

curred during the final stage of pregnancy, and we recommended the use of a new purification method.

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