MEDICAL MEMORANDA

Hypothermia, Thrombosis, and Acute Pancreatitis

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The aetiology of the pancreatitis that complicates some cases of accidental hypothermia is unknown. (Duguid *et al.*, 1961; Read *et al.*, 1961). Widespread arterial or venous thrombosis and visceral infarction has been found in a number of cases of accidental hypothermia coming to necropsy, but has not been related to the development of acute pancreatitis (Duguid *et al.*, 1961).

We report here a case of fatal hypothermia with acute pancreatitis in which pancreatic venous thrombosis occurred in the upper superior pancreatic duodenal vein and its intrapancreatic branches. These findings suggest that acute pancreatitis in hypothermia may be due to pancreatic ischaemia.

Case Report

A 75-year-old woman was admitted to hospital in a state of confusion. The history was available from neighbours who found her semiconscious in her flat after they had not seen her for two days. Her general condition had been deteriorating since her husband died four months previously.

She was confused with marked peripheral cyanosis and cold limbs. Rectal temperature was 30.5°C and her pulse rate was 48/min. B.P. was 150/100 mm Hg and the jugular venous pressure was normal. There was no sacral oedema but mild ankle oedema was present. Her chest was clear and there were no crepitations. There was generalized and rebound tenderness of the abdomen. Bowel sounds were present and no masses were palpable. The rectum contained faeces. There were no localizing neurological signs.

Investigations were: Hb 16g/100 ml; W.B.C. 9,500/mm³; serum amylase 3,000 Somogyi units/100 ml; serum aspartate aminotransferase 17 U/100 ml; serum lactic dehydrogenase 286 U/100 ml; urea 66 mg/100 ml; electrolytes normal; blood sugar 100 mg/100 ml; P.B.I. 5.4 mg/100 ml. The results of liver function tests were normal. Electrophoretic strip showed a diminished albumin. E.C.G. showed obvious J waves characteristic of hypothermia.

Treatment consisted of passive rewarming 1°F (0.6°C) hourly, intravenous fluids, and nasogastric suction. Antibiotics were administered, and intravenous plasma and frusemide were given for the next two days. Her blood pressure fell to about 90/60 mm Hg next day, however, and remained low in spite of plasma infusions. She became anuric and died later that day.

Necropsy showed bronchopneumonia, infarcted areas in the gall bladder, duodenum, and adrenal glands, haemorrhagic pancreatic

necrosis, and thrombosis of the upper superior pancreaticoduodenal vein. The duodenum was surrounded by adhesions that included the body and head of the pancreas and part of the transverse colon. The thyroid gland and the kidneys were normal and there were no gall stones.

Death was attributed to hypothermia with bronchopneumonia and acute pancreatitis as contributing factors.

Histological examination showed diffuse areas of pancreatic necrosis with fat necrosis in the related omentum, and some of the pancreatic ducts were filled with leucocytes and fibrin. Numerous small venules were thrombosed, and there was a recent thrombus in the upper superior pancreaticoduodenal vein. A neighbouring pancreaticoduodenal lymph node showed sinus histiocytosis and lipophages. Numerous lipophages were also found in an isolated paraoesophageal lymph node, indicating the severity and extent of the pancreatitis. The liver showed hepatocellular disarray and fatty changes with portal vein thrombosis in the portal tracts. The adrenal glands were severely and extensively infarcted, with virtually all the medullary veins and venules thrombosed.

Comment

A review of published necropsy studies of non-hypothermic acute pancreatitis showed no unexpectedly high incidence of visceral thrombosis and infarction (Innerfield *et al.*, 1952; Blumenthal and Probst, 1959; Schultz, 1965; Geokas *et al.*, 1972; Greipp *et al.*, 1972). A personal review of available histological findings and the necropsy reports of 30 cases of non-hypothermic acute pancreatitis at the Whittington Hospital from 1964-72 similarly failed to show any tendency for arterial or venous thrombosis to occur.

It seems therefore that visceral thrombosis and infarction are complications of hypothermia rather than of pancreatitis. Coronary thrombosis and myocardial infarcts in not more than four out of 13 hypothermic necropsy cases were reported by Duguid *et al.* (1961), together with infarcts in the lungs and brain. This indicates that the thrombosis are not confined to abdominal viscera only—such as gall bladder, duodenum, and adrenals—as seen in this necropsy, but that the condition could be a generalized one, and such distal organs as the heart, lungs, and brain may be affected.

The circulatory stasis of hypothermic states may be the particular predisposing factor (Duguid *et al.*, 1961). In our patient, the thrombosis of the upper superior pancreaticoduodenal vein and its intrapancreatic branches may thus have been responsible for the pancreatitis rather than secondary to it.

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