

ACUTE PANCREATIC INFLAMMATION

Pages with reference to book, From 194 To 196

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The exocrine function of the pancreas is to produce more than twenty proteins on demand, necessary for digestion. The catalytic activity of these proteins is protected by natural mechanisms so as to prevent autodigestion. Trypsin, chymotrypsin, elastase, carboxypeptidase A and B and phospholipase A are stored in the acinar cells of the pancreas as inert proenzymes having a negligible amount of catalytic activity¹. The trypsin inhibitor protects the trypsin activation of zymogen until it reaches the duodenum. Lastly the blood supply to the pancreas contains antiproteases, an additional protection against intrapancreatic activation of zymogen and pancreatic autodigestion.

The exocrine secretion of the pancreas mainly enters the duodenum through the pancreatic ductal system. A small fraction enters the blood as zymogens. But in acute pancreatitis the levels of immunoreactive trypsin^{2,3} and chymotrypsin⁴ rises significantly.

A variety of changes occur in the condition of acute pancreatitis. Vasoactive peptides are released which cause oedema, induration and at times necrosis with destruction of the vessels and thrombosis. Many factors have been attributed to lead to the breaking of the natural protective mechanism in this organ. Ethyl alcohol abuse, biliary tract disease, peptic ulcer, trauma to the pancreas, viral and bacterial infections, hyperlipoproteinaemias type I, N and V, hypercalcaemia, certain drugs as oestrogens, thiazides and corticosteroids and carcinoma of the pancreas, primary or secondary, are some of the contributing factors. The cellular mechanism is disturbed, permeability of the cell wall is increased and there is a premature activation of zymogen by trypsin, leading to autodigestion.

Coagulation necrosis, haemorrhage and thrombosis are caused by the activity of elastase and phospholipase A.⁵ The exact role played by ethanol and its main metabolite acetaldehyde, in causing pancreatic injury is not known. Ethanol is the main constituent of alcohol, whereas acetaldehyde is also present in cigarette smoke. That they both inhibit various cellular processes especially in the liver^{6,7} is a known fact. Binding of acetaldehyde to cellular macromolecules causing an impaired function may be a possible mechanism⁸.

It has been established that calcium promotes trypsinogen activation and stabilizes trypsin and the other pancreatic enzymes. Thus in conditions of hypercalcaemia as parathyroid, adenocarcinoma, hypervitaminosis D and hypocalcaemic hypercalcaemia, acute pancreatitis may be encountered⁹. It has also been postulated that with the pancreas full of enzyme protein, the calcium influx into the cells leads to cell death and necrosis by aiding the action of membrane active toxins^{10,11}

The diagnosis of pancreatitis is one of the most difficult situations faced by a clinician. Computed tomography and ultrasound scanning are a big help. Other investigations that can be recommended are plain radiography of the abdomen, barium study and magnetic resonance imaging. The plain radiograph of the abdomen in erect and recumbent postures helps to exclude free air in the abdominal cavity. Partial ileus of the duodenum, transverse colon or a loop of the jejunum, called the sentinel loop, may be visualized and this is a diagnostic feature of acute pancreatitis.¹² The factors leading to ileus is the seepage of pancreatic exudate along the mesocolon.

Ultrasound imaging projects a focal or total enlargement of the pancreas. Difficulties are encountered when the patient is obese or gas filled distended bowel loops lie in front of the pancreas. C.T. Scanning ascertains the size of the pancreas¹³ A slight increase in dimensions is noted in case of acute oedematous pancreatitis. Marked enlargement with an irregular contour is noted in the haemorrhagic necrotizing form. Gross enlargement with ascites is seen in the suppurating type.

Magnetic resonance imaging, one of the latest diagnostic techniques¹⁴ identifies hydrogen protons thus detecting early pancreatic oedema. But differentiation between inflamed peripancreatic fat, dilated pancreatic ducts, necrotic tissue and viable pancreatic tissue is difficult. The investigation of choice thus remains CT imaging with Ultrasonography taking the second place.

Acute pancreatitis presents as an acute abdomen. The pain is severe in intensity and persists for hours or days. Nausea and vomiting accompany the pain or there may be retching. Guarding of the abdomen is present. A raised serum amylase level has been used as a diagnostic feature for acute pancreatitis. It is important to note that serum amylase is elevated in a number of intra-abdominal pathologies as perforated peptic ulcer, biliary colic, mesenteric infarction¹⁵ as well as in salivary gland dysfunction, renal insufficiency and certain lung and kidney tumours¹⁶. Determination of serum amylase isoenzymes is a more accurate guide to the diagnosis of acute pancreatitis. P-type isoamylase derived from the pancreas constitutes 40 percent of the total serum amylase in the normal state of health. The remaining 60 percent is the S-type from the salivary glands.¹⁷ In acute pancreatitis the level of P-type isoamylase rises tremendously.^{17,18,19} Serum lipase concentrations rise and remain so for a longer period in acute pancreatitis.

The patient with an episode of acute pancreatitis should be adequately hydrated due to losses in the retro peritoneal spaces. Central venous pressure should be monitored if necessary. As protein loss is high, colloids should be added to the replacement fluids. Oral feeds are restricted till the patient is on the road to recovery and the abdominal pain subsides with return of bowel sounds, appetite improves and serum amylase levels recede to normal. Nasogastric aspiration is recommended if there is incessant vomiting or ileus. The role of cimetidine has been questionable as decreasing the basal acid apparently has no benefit.²⁰ Analgesics that do not constrict the sphincter of oddi are used to reduce pain.

Metabolic acidosis may be present in severe cases²¹ and has to be corrected. Nourishment is provided parenterally, fluid and electrolyte balance is stabilized and peritoneal lavage, the benefits of which are questionable, is recommended in a few selected cases.

Despite the advances in the field of research, a specific therapy for acute pancreatitis is yet to be found.

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