Amylase Assay and Diagnosis of Pancreatic Disease

Miffin et al. (1), in this issue, describe a more specific method for pancreatic amylase in serum. Amylase of salivary origin is precipitated with a monoclonal antibody, and the amylase remaining is presumed to come from the pancreas. It is likely that their test will be more specific for pancreatic disease.

Since the recognition of multiple sources of amylase and of the frequency of hyperamylasemia in both extra-abdominal and many non-pancreatic abdominal disorders, caution must be used in interpreting an abnormal value for serum amylase. Although assay of serum amylase appears to be a sensitive indicator of acute pancreatitis, it is not specific. Laboratory tests intended to improve the specificity include the amylase/creatinine clearance ratio, isomylase determinations by electrophoresis (2) and the wheat-starch inhibitor method (3), lipase assay, and now a monoclonal inhibitor of salivary amylase. Improved specificity of the serum amylase assay should lead to more accurate diagnosis and avoidance of unnecessary and costly radiographic studies such as ultrasound, computerized tomography, and endoscopic retrograde cholangiopancreatography.

A common and incorrect assumption is that with a more specific biochemical marker, the clinician can more readily identify patients who require prompt surgical intervention. Such decisions must be based on all the available information: results of multiple laboratory results over time, radiographic findings, clinical findings, history, and the like. A single laboratory result, no matter how specific, will not necessarily make easier the identification of cases requiring surgery. The principal indication for laparotomy is when the diagnosis is in doubt in an acute situation, and a perforated or gangrenous intra-abdominal viscus cannot be excluded. There are three clinical situations in which improved specificity of a serum amylase determination would be helpful: (a) abdominal pain and hyperamylasemia, (b) hyperamylasemia and no abdominal pain or gastrointestinal symptoms, and (c) no abdominal pain and a normal value for amylase.

In cases where the patient has abdominal pain, gastrointestinal symptoms without evidence of obstruction or perforation, and an abnormal value for amylase, most physicians would make a diagnosis of pancreatitis. Weaver et al. (4) found that only a third of such patients had pancreatitis. Of patients with alcohol-associated abdominal pain presenting with an abnormal amylase value, only 15% were found to have an increased pancreatic amylase suggesting pancreatic involvement (5). When only a result for total amylase is available, overdiagnosis of pancreatitis is likely in these patients.

In the second situation—hyperamylasemia but no abdominal pain—drugs (6), multiple trauma without obvious abdominal injury (7), renal failure, or diabetic ketoacidosis may be the cause of the increased amylase. Here, improved specificity has been found for serum isomylase measurements and lipase; information on the amylase/creatinine clearance ratio has not been helpful. Presumably, the monoclonal inhibition assay described by Miffin et al. (1) would be helpful here as well.

The third clinical situation occurs rarely. A patient with pancreatitis may have a normal amylase value if seen a few days after the onset of disease. Possibly assay of lipase (8) or pancreatic amylase in serum, or amylase in urine, would be helpful in these cases. There is evidence that the activity of pancreatic amylase in serum remains abnormal longer than does the total amylase (9).

References

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