Glucagon augmented Tc99m-pertechnetate scintigraphy for detection of ectopic gastric mucosa in Meckel’s diverticulum

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The utility of Tc99m-pertechnetate scintigraphy in the diagnosis of ectopic gastric mucosa is well established, particularly, in the case of Meckel’s diverticulum, despite substantial variation in the reported sensitivity. In the present report, the role of glucagon augmented Tc99m-pertechnetate scintigraphy for detection of ectopic gastric mucosa in a child with Meckel’s diverticulum is highlighted.

An 11-year-old boy was evaluated for rectal bleeding of 6-month duration. All routine and radiological investigations were unremarkable. Colonoscopy failed to localize the bleeding site. A scintigraphic evaluation for detection of ectopic gastric mucosa also failed to show any abnormal uptake in the abdomen. However, based on strong clinical suspicion the child underwent a repeat Tc99m-pertechnetate scintigraphy augmented with glucagon (50 mg/kg body weight I/V 10 min after the Tc-99m pertechnetate). This scan revealed a focal area of abnormal tracer activity in the abdomen suggestive of functioning ectopic gastric mucosa [Figure 1]. At exploratory laparotomy a Meckel’s diverticulum was excised; ectopic gastric mucosa was seen on histopathological examination.

A variety of congenital gastrointestinal malformations are associated with ectopic gastric mucosa. Tc99m-pertechnetate is selectively taken up and secreted into the lumen of the organ by the mucoid cells that line the surface of the gastric mucosa whether it is in the stomach or elsewhere. Pentagastrin, histamine H₂ blockers and glucagon may enhance the detection of ectopic gastric mucosa in Meckel’s diverticulum by Tc99m-pertechnetate scintigraphy. Glucagon (50 mg/kg I/V 10 min after the Tc99m pertechnetate) relaxes the smooth muscles of the gastrointestinal tract and thereby decreases peristalsis. Pentagastrin (6 mg/kg S/C 15–20 min prior to the Tc99m pertechnetate) is a potent stimulator of gastric secretions, increases uptake and secretion of pertechnetate by the gastric mucosa and stimulates gastrointestinal motility. Histamine H₂ blockers block secretion from the cells and increase gastric mucosa uptake (oral cimetidine 20 mg/
kg/day for 2 days in children or 1–20 mg/kg/day in neonates prior to starting; I/V cimetidine 300 mg in 100 ml 5% dextrose over 20 min with imaging starting 1 h later; ranitidine 1 mg/kg I/V over 20 min and imaging starting 1 h later, or 2 mg/kg/dose P/O). H₂ blockers antagonize pentagastrin, hence they should not be combined. False positive results may occur in peptic ulcer, vascular malformations, inflammation, intussusceptions, obstructed bowel loops, and urinary tract abnormalities. Accumulation of Tc99m pertechnetate in the islands of gastric mucosa allows their detection by scintigraphy only if they are functioning and of sufficient size. A false negative study may occur due to nonfunctioning/necrosed mucosa, small amount of ectopic gastric mucosa, dilution of secreted isotope as a result of hemorrhage or intestinal transit or due to the presence of activity in overlapping organs, e.g., the urinary bladder.[4]

REFERENCES