

## Gastro-intestinal scintigraphy in Paediatrics

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All babies regurgitate milk to a greater or lesser extent. In most this is a normal self limiting phenomenon but in a small proportion there are complications which fall into two broad groups, respiratory and gastrointestinal. The symptoms and signs of the complications are not specific and the milk scan is useful in children with symptoms and signs severe enough to warrant investigation. It provides an overall assessment of oesophageal transit, gastro-oesophageal reflux, and gastric emptying and pulmonary aspiration may be detected. Careful observation of the child and the display screen during the study often provides a direct link between a symptom and an abnormality. Many aspects can be quantified and abnormalities tend to form recognizable patterns. Identification of the major or dominant abnormality is usually possible and useful in planning management. The radiation dose is low and follow up studies can be done to assess the effect of treatment. Unfortunately there are no generally accepted guidelines on performing milk scans, probably because of differences in the spectrum of patients studied at different institutions and because variations in the method are useful. For example, in a child with severe gastro-oesophageal reflux a study with a thickened feed often provides useful information on the efficacy of this form of treatment while the salivagram is probably better at detecting aspiration than a conventional milk scan, particularly in retarded children.

In our hospitals symptoms and signs attributable to the complications of short bowel syndrome in children who had jejunal atresia are the commonest indications for studies of small bowel transit. In many of these children the labelled feed pools in a segment of the small bowel with normal transit distal to this segment. A similar pattern may occur in many other conditions including malrotations, collagenous sprue and a smooth muscle myopathy.

Large bowel transit studies can provide useful information in constipation, particularly when there is a neurological abnormality. However in children who present complaining of constipation and soiling, a small bowel transit study which is extended to monitor passage of activity in the large bowel often shows normal or even rapid transit into sigmoid colon or rectum.

In children who present with a history of ingesting a caustic substance, there is over 90 % concordance between the endoscopy findings and a simple static image recorded immediately after swallowing about 4ml of Tc-99m-sucrafate followed by 10ml of milk. Sucrafate scintigraphy is also useful in children with suspected *Candida* oesophagitis.

Historically, the main indication for hepatobiliary scintigraphy has been the possibility of biliary atresia in the differential diagnosis of a baby with prolonged neonatal jaundice. In most babies careful inspection of the interior of formed stools collected in separate containers over at least 3 days will show the presence of bile pigment in the interior of the stool and so exclude atresia. When the results of stool inspection are equivocal or the stools are not formed, scintigraphy is useful. Premedication with phenobarbitone prior to scintigraphy is advocated by many centres. The key finding in excluding biliary atresia is the detection of activity in the gut (SPECT can be useful in doing this). In addition there are less specific findings such as differences in the rates of uptake of Tc-99m butyl-IDA or Mebrofenin and in the liver shape in children with biliary atresia and neonatal hepatitis. Differentiation between biliary atresia and neonatal hepatitis is particularly difficult in babies with biliary atresia who present late and in those with cholestasis associated septicaemia or parenteral nutrition.

Hepatobiliary scintigraphy is also useful in children with choledochal cysts or gall bladder abnormalities. In the latter measurement of gall bladder ejection fraction is often necessary.

Scintigraphy for a Meckel's diverticulum containing gastric mucosa is accurate if close attention is paid to patient preparation and the causes of false positive and negative results. The study should not be done while the patient is actively bleeding. Pretreatment with cimetidine (or pentagastrin or glucagon) is said to improve sensitivity but is not essential. Inadequate fasting prior to the study and bleeding shortly before or during the study are probably the commonest causes of false positive and false negative scans.



Tests for occult blood in stool are extremely sensitive and scintigraphy is unlikely to be useful if a positive occult blood test is the only evidence of gastrointestinal blood loss. As gastrointestinal bleeding is often intermittent, scintigraphy using in vitro labelled RBCs should be started as soon as possible after an episode of bleeding starts. The purpose of scintigraphy is to localize the site of bleeding and my personal view is that this is very difficult when the rate of bleeding is not high.