

## Case Report

# Nuclear Imaging in Meckel's Diverticulum

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### Introduction

Meckel's diverticulum is the most common congenital anomaly of the gastrointestinal tract involving the small bowel and terminal ileum. Gastrointestinal bleed is the commonest complication in the paediatric age group. Radiological studies like barium meal follow through examination rarely reveal reflux of contrast into the diverticulum and are limited in their ability to diagnose the disorder. Surgical exploration was the only means of confirming the diagnosis in the past. We wish to highlight the role of nuclear imaging using  $^{99m}$  technetium pertechnetate as a simple, non invasive investigation in the diagnosis of Meckel's diverticulum.

### Case Report

A four year old child presented with recurrent episodes of pain abdomen around the umbilicus associated with passage of fresh blood per rectum off and on for the last one and half years. There was no history of vomiting or diarrhoea. Physical examination of the child was non contributory. Patient was referred to the nuclear medicine department to confirm the possibility of Meckel's diverticulum.

The patient was asked to be fasting for four hours prior to scanning. An intravenous injection of  $^{99m}$  technetium pertechnetate was given in the dose of 100 micro curie/kg body weight. Imaging over the abdomen in the anterior projection was started immediately and carried on upto half an hour under a large field of view gamma camera as per laid down protocol [1]. Liver, spleen, great vessels were visualized in early images with prominent gastric activity appearing at approximately 15 min in the left upper quadrant. Simultaneously there was appearance of a small round area of intense tracer activity in the right lower quadrant of abdomen suggesting the presence of ectopic gastric mucosa (Fig. 1). Patient was taken up for exploratory laparotomy which confirmed the presence of Meckel's diverticulum. Patient was subjected to diverticulectomy with end to end anastomosis.

### Discussion

Meckel's diverticulum results from the in utero failure of closure of omphalomesenteric duct and is seen to occur in 1-3% of the population. The diverticulum tends

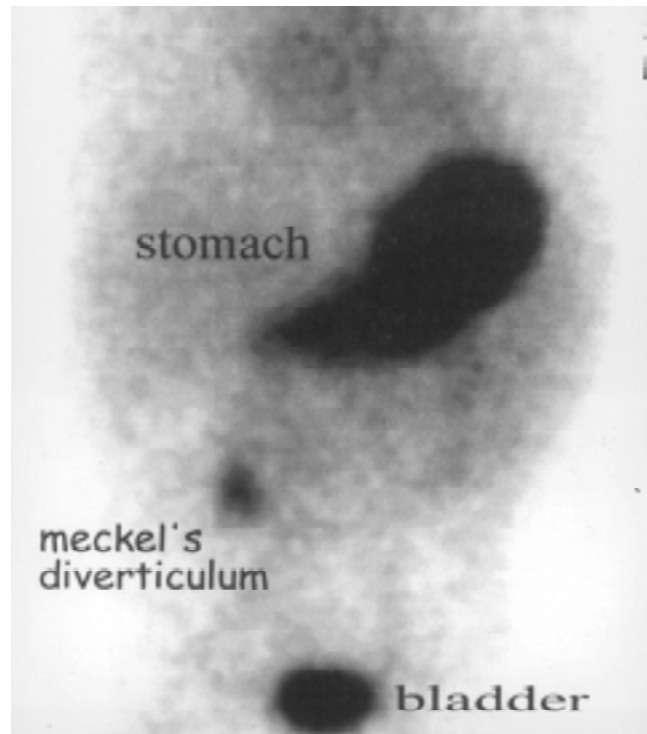


Fig. 1 : 15 min  $^{99m}$  technetium pertechnetate image of abdomen in anterior projection showing radiotracer in stomach and a round area of intense radiotracer uptake in right lower quadrant

to occur on the antimesenteric side of the terminal ileum within two feet from the ileo-cecal valve. Most of the lesions remain asymptomatic throughout life, however, it may present in adults in the form of haemorrhage, volvulus, intussusception and perforation. In children bleeding per rectum is the commonest presentation. Approximately 50% of all Meckel's diverticula contain gastric mucosa. It is the diverticula containing ectopic gastric mucosa that commonly ulcerate and bleed.  $^{99m}$  technetium pertechnetate is primarily concentrated by the mucus secreting cells of the stomach. The ectopic gastric mucosa present in the Meckel's diverticulum accumulates the  $^{99m}$  Tc pertechnetate by the same mechanism as the normal gastric mucosa [2].

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The specificity and sensitivity of nuclear imaging in Meckel's diverticulum is 85% and 95% respectively in children while in adults the sensitivity and specificity are low being around 60% and 9% respectively [3]. Connolly et al have used single photon emission computed tomography (SPECT) to enhance pick up rate of small Meckel's diverticula [4]. Various pharmacological agents have also been used to enhance the sensitivity of Meckel's scintigraphy. Oral cimetidine [5] has been found to increase the target to background ratio by inhibiting intraluminal secretion of pertechnetate, subcutaneous pentagastrin [6] to increase the mucosal uptake of pertechnetate and intravenously administered glucagon [2] has been found to decrease intestinal peristalsis and thus enhance the accumulation of pertechnetate. In our case no pharmacological pretreatment was undertaken.

False negative studies have been attributed to the diverticulum containing mucosa other than gastric, necrosis of the mucosa and rapid peristalsis. False positive studies have been seen to result from abnormal uterine blush [7], Crohn's disease, ulcerative colitis, appendicitis and less commonly due to renal activity [8]. However, despite these pitfalls, nuclear imaging with  $^{99m}$  technetium pertechnetate is seen to serve as a simple, safe and non invasive tool in the diagnosis of

Meckel's diverticulum especially in paediatric age group patients.

### References

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### MEDICAL RECORDS GONE WRONG

These are actual, unedited doctor's notes on patients charts :

- Patient has chest pain when she lies on her left side for over a year.
- On the 2<sup>nd</sup> day the knee was better and on the 3<sup>rd</sup> day it disappeared completely.
- She has had no rigors or shaking chills, but her husband said that she was very hot in bed last night.
- The patient has been depressed ever since she began seeing me in 1993.