

The clinical utility of SPECT/CT hybrid imaging on bleeding Meckel's diverticulum in adults

Abstract

Techneium-99m (^{99m}Tc)-pertechnetate planar scintigraphy is the procedure of choice to localize ectopic gastric mucosa. However, single photon emission computed tomography/computed tomography (SPECT/CT) provides precise landmarks and scintigraphic findings. We report a case of an adult patient with Meckel's diverticulum involving an atypical location, within the pelvic region, next to the right margin of the urinary bladder. Imaging characteristics supported the diagnosis of either Meckel's or bladder diverticulum. Single photon emission computed tomography /CT was the key method to obtain definite diagnosis, since the low-dose CT revealed the presence of air within the lesion of radiotracer uptake. This finding was suggestive of an outpouching of the bowel wall.

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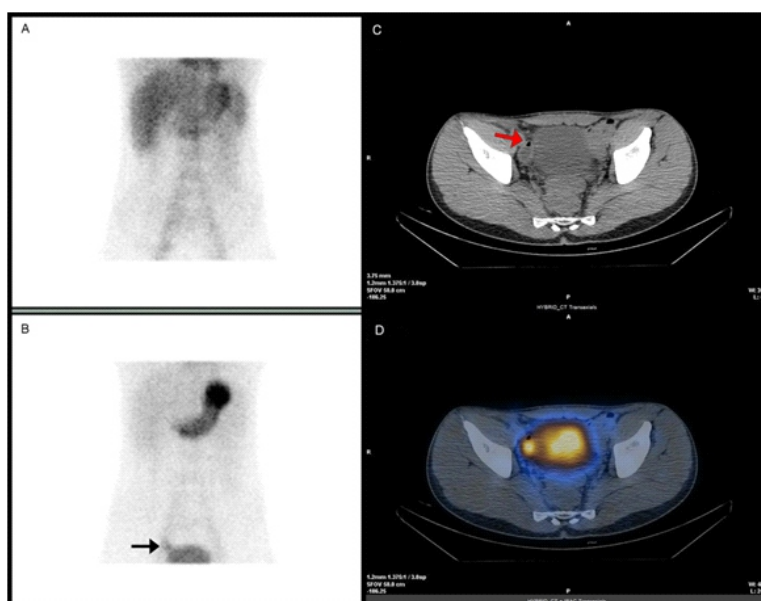


Figure 1. A 23-year-old male presented with black stools and several painless episodes of active intestinal bleeding. Sequential planar images 5min (A) and 20min (B) following the intravenous administration of 185MBq (5mCi) of ^{99m}Tc -pertechnetate demonstrated a subtle focal uptake in the right iliac fossa, next to the urinary bladder (black arrow). Imaging characteristics supported the diagnosis of either Meckel's diverticulum or bladder diverticulum. Axial CT (C) and SPECT/CT hybrid images (D) revealed the exact anatomical localization of the focal uptake, within the pelvic region, next to the right margin of the bladder. Moreover, SPECT/CT was the key method for the differential diagnosis since the low-dose CT demonstrated the presence of air within the lesion of radiotracer uptake (red arrow). This finding was suggestive of an abnormal bulging pouch of the bowel, not the bladder, and consistent with Meckel's diverticulum.

Meckel's diverticulum is the most common malformation of the gastrointestinal tract [1]. Although symptomatic Meckel's diverticulum is an uncommon entity during adulthood, it may give rise to bleeding, intestinal obstruction, inflammation, intussusception, and neoplasm [2, 3].

Multiple techniques have been used to detect Meckel's diverticulum, however they are generally of limited value. Technetium-99m pertechnetate planar scintigraphy is the procedure of choice, since more than 50% of symptomatic diverticula contain ectopic gastric mucosa [3, 4]. The lesion is typically seen in the right lower quadrant as focal abdominal uptake of radioactivity that appears simultaneously with that in the stomach [1, 2]. The method has a diagnostic sensitivity of 85%, specificity of 95% and an overall accuracy of 90% [1, 5], however in adults the test is only 9% specific and 62% sensitive [6]. Single photon emission computed tomography/CT provides better anatomical landmarks, it reduces image misinterpretation, and it assists in the detection of lesions not visualized on planar images [4, 7]. Moreover, it enables a direct relationship between the position of Meckel's diverticulum and the adjacent abdominal organs. Single photon emission computed tomography/CT is increasingly being used in the clinical nuclear medicine.

In a recent study, Liu et al. (2020) referred to the clinical utility of SPECT/CT in the detection of ectopic gastric mucosa. They concluded that SPECT/CT alone or the combination of the two imaging techniques results in higher specificity of scintigraphic findings and enhanced diagnostic outcome [8]. Additionally, it improves anatomical information and obviates unnecessary referrals to surgical treatment [8]. The utility of fusion imaging on bleeding Meckel's diverticulum requires further clarification.

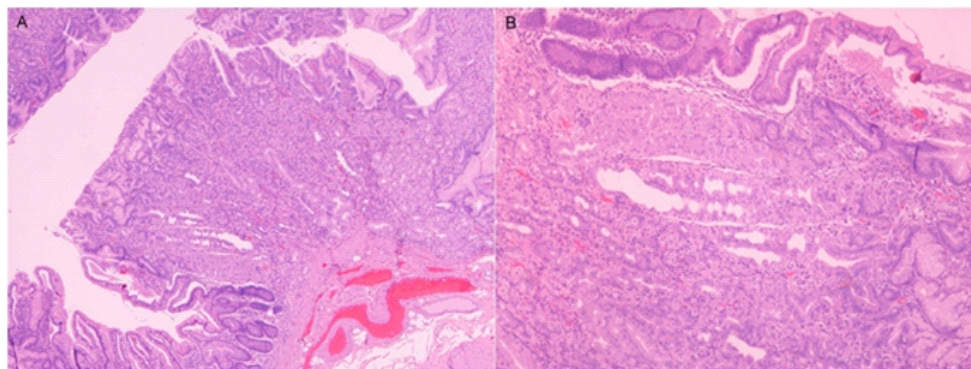


Figure 2. A 23-year-old male presented with painless episodes of active intestinal bleeding. The lesion was laparoscopically removed. Histological examination of the resected specimen confirmed the diagnosis of Meckel's diverticulum with ectopic gastric and duodenal mucosa (hematoxylin-eosin). (A) Ectopic gastric mucosa and normal small intestine mucosa (H.Ex40). (B) Ectopic gastric mucosa and normal small intestine mucosa (H.Ex100).

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