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99mTc Pertechnetate in Diagnosis of Meckel's Diverticulum in an Adult Patient: Case report

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ABSTRACT

One of the most common malformations of gastrointestinal tract is Meckel's diverticulum. MD symptoms can be minor to major complications, such as intestinal obstruction, intussusception, hemorrhage, ulceration, vesicodiverticular fistulae, and tumors. Bleeding from ectopic gastric mucosa is common in pediatrics more than in adults. In the current case, MD in a 25-year-old man was diagnosed by 99mTc pertechnetate. 99mTc pertechnetate helps to diagnose MD noninvasively and has a potential role in the evaluation of Meckel's Diverticulum even with adult patients.

Keywords: Meckel's Diverticulum, GI Bleeding, 99mTc pertechnetate.

INTRODUCTION

One of the most common malformations of gastrointestinal tract is Meckel's diverticulum (MD) and, it is very common at a young age in pediatrics and rare in adults. MD symptoms can be minor to major complications, such as intestinal obstruction, intussusception, hemorrhage, ulceration, vesicodiverticular fistulae, and tumors. Bleeding from ectopic gastric mucosa is common in pediatrics more than in adults *(1).* In the current case, MD in a 25-year-old man was diagnosed by 99mTc pertechnetate.

CASE REPORT

A 25- y-old man was present at King Saud Medical City. The patient complained as he noticed blood in his stool. There was no abdominal pain or discomfort. Physical examination did not show any specific indication. There was no history of trauma. In addition, the patient has a high white blood cell count 13.16 per microliter. The reference range at King Saud Medical City for white blood cell count is between 4 to 10 per microliter. Also, the patient's Hemoglobin level dropped to 6 and the reference range is 13 to 17 grams per deciliter. Consistent with the patient's symptoms; drop hemoglobin level, melena, and the GI endoscopy that detected small bowel bleeding a Computed Tomography (CT) angiogram was ordered.

The finding of CT scan revealed no sign of active bleeding within the bowel loops. There was a focal blind-ended tubular stricture forming the distal ileal loop which measured 2.3 x 1.3 cm. and revealed wall thickening and mural hyperenhancement (Fig. 1). There were no signs of abdominopelvic collection or hematoma. The final impression for the CT angiogram was a sign of Meckel's Diverticulum that needed to be confirmed by nuclear medicine scan 99mTc pertechnetate.

The patient preparation for Meckel's Diverticulum nuclear medicine scan was nothing by mouth (NPO) at least 4 hours before the scan. Also, barium or contrast studies could affect nuclear medicine scans. The patient was injected with 370 MBq (10 mCi) while lying supine under the gamma camera. The included area was from the xiphoid to the pubis. Flow dynamic image was obtained 15 seconds per frame for 30 minutes. Also, a static image was acquired anteriorly over the same area for 5 minutes. Afterward, SPECT/CT image was performed over the same region, using a 360-degree rotation, 128 X 128 matrix, at a rate of 30 seconds per frame.

The study demonstrated evidence of area of abnormal uptake of the radiotracer seen in the right lower quadrant that showed high intensity. It was similar to gastric mucosa's kinetic (Fig. 2). The focal abnormal activity was increased during the scanning time, suggesting active bleeding by Meckel's Diverticulum measuring 3.5 X 2.5 cm. There was another focal uptake seen below the liver, suggested to be a renal uptake clear in the posterior image. SPECT/CT fused image confirmed that (Fig. 3). The patient was taken to the operating room for laparotomy to remove the diverticulum and it went successfully (Fig. 4). A surgical biopsy was sent to the histopathology unit and it confirmed the initial diagnosis.

DISCUSSION

MD is one of the most common congenital malformations of the vitello intestinal duct. Historically, the first time MD was mentioned was in 1598, and at that time MD was not understood nor recognized until 100 years later *(1).* Bleeding from ectopic gastric mucosa, especially chronic bleeding, is not common in adults *(1).* The main reason for bleeding is the acid secretion from ectopic mucosa, which causes ulceration in the ileal mucosa *(2).*

It has been known among surgeons and in some textbooks that the two rules in Meckel's Diverticulum are 2 ft from the ileocaecal junction 2 in 2% population, common in children under 2 years of age and that it affects males twice as much as females *(3).*

Many adult patients with MD present abdominal pain or bleeding and these indications might be confused with other complications which have the same symptoms. In addition, laboratory tests and physical examinations are unhelpful in the case of Meckel's Diverticulum *(4).* In this case, the CT angiogram was able to visualize Meckel's Diverticulum. However, the indication was not confirmed until the nuclear medicine scan was performed.

99mTc pertechnetate MD scan is superior more than other modalities. 99mTc pertechnetate MD has a sensitivity of 80% to 90% and a specificity of 95%, particularly in pediatric patients. The sensitivity of the scan might decrease in adult patients. However, few adult patients with MD have been diagnosed using 99mTc pertechnetate *(5).* In this case report, Meckel's Diverticulum scan was able to confirm the CT indication as well as the histopathology results.

CONCLUSION

99mTc pertechnetate helps to diagnose MD noninvasively and has a potential role in the evaluation of Meckel's Diverticulum even with adult patients.

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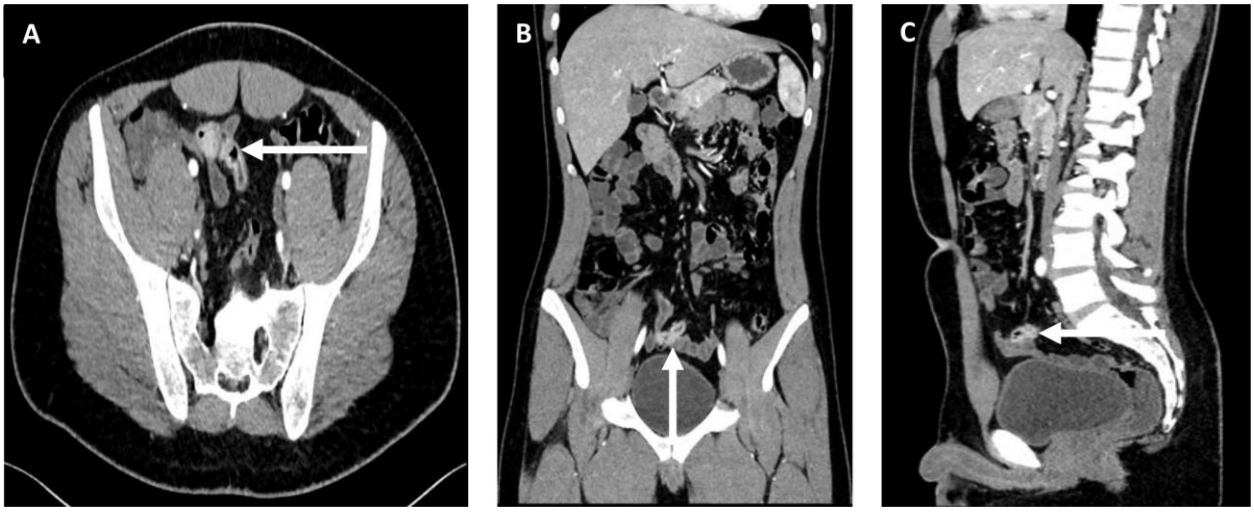

FIGURE 1. CT abdominal pelvic late arterial phase . (A) an axial view (B) coronal view and (C) Sagittal view. **A** Focal blind ended tubular stricture form the distal ileal loop *(horizontal arrow) and (Vertical arrow).* which is measured 2.3 x 1.3 cm.

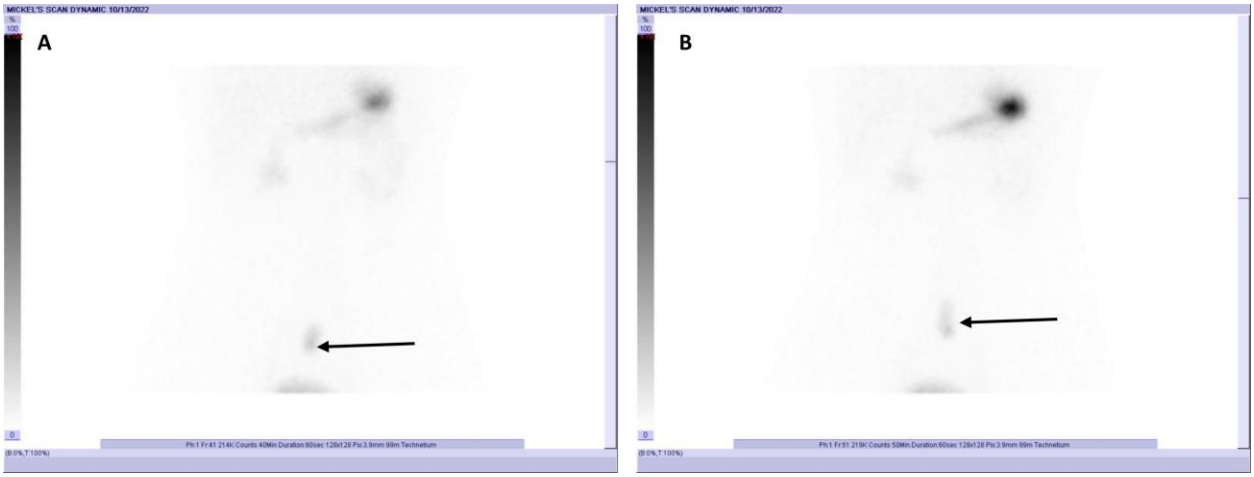

FIGURE 2. Tc99m pertechnetate nuclear medicine scan. (A), (B) are anterior views for the dynamic acquisition. (A) the focal uptake is not fully visualize. Even though there is slight uptake is seeing. (B) The uptake was increasing over the time. (B) complete visualize uptake in 50 minutes *(horizontal arrows)*.

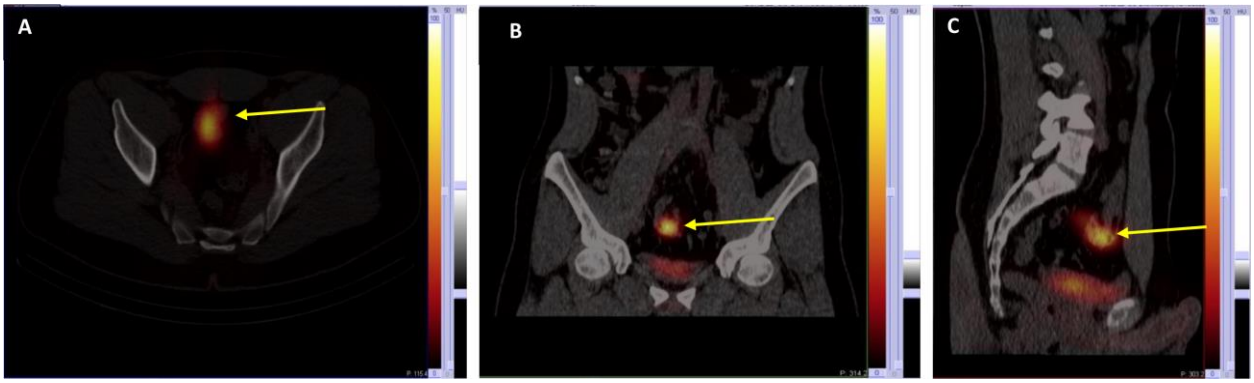

FIGURE 3. Tc99m pertechnetate nuclear medicine scan, SPECT/CT **A** axial, **B** coronal and **C** sagittal. SPECT/CT views were required for conformation and anatomical purpose. The focal abnormal activity was increase during the scanning time suggesting active bleeding by Meckel's Diverticulum *(yellow arrows).*

FIGURE 4. Intraoperative Meckel's diverticulum photo images, **A** before the surgery **B** diverticulum Resected. **C** Micrograph shows the small intestine mucosa (*horizontal arrows)* adjacent to the gastric heterotopic mucosa *(Vertical arrow).*