Uterine Activity: A Potential Cause of False-Positive Meckel's Scans

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Sodium pertechnetate (Tc-99m) can accumulate in the uterus and result in a "false-positive" Meckel's scan. Early, intense activity in the pelvis, which diminishes with time, should alert the physician to the possibility of uptake by the female reproductive organs. Ultrasound, TCT, or radiographic examinations may be necessary when findings are equivocal.

J Nucl Med 22: 886–887, 1981

Abdominal scintigraphy with pertechnetate (Tc-99m) is a widely used technique for detecting Meckel's diverticula containing heterotopic gastric mucosa (*1*,*2*). One pitfall of this procedure has been the large number of false-positive examinations, which have been estimated to run as high as 10% (*3*). Many false-positive scans, however, are of surgical significance and include appendicitis, duplication cysts, abscesses, or neoplasms. Recently, during pertechnetate scanning, we have encountered several cases of nonpathologic focal increased abdominal activity that we feel was occurring in the uterine blood pool. Although this has not been reported previously, the physician must be aware of its occurrence and character in order to prevent misinterpretation that could result in needless surgery.

CASE REPORTS

Case 1: A 25-year-old white female presented with a marked iron-deficiency anemia and guaiac-positive stools. Sequential tests—including barium contrast studies, small-bowel enteroclysis, and jejunal biopsies—were all normal. A Meckel's scan demonstrated intense early focal activity in the left lower abdomen, diminishing with time (Fig. 1, left). Ultrasound was immediately performed; it showed the uterus to be deviated to the left and to lie in the exact location of the pelvic activity (Fig. 1, center). No other pelvic abnormalities were identified. Concern for a vascular malformation or tumor prompted a pelvic TCT flow study, which was negative except for prominent enhancing uterine vessels (Fig. 1, right). Because of the negative workup, we elected to monitor the patient's stool for blood and to treat with oral iron. The patient's hematocrit returned to normal and symptoms resolved.

Comment: This case demonstrates intense early activity in the pelvis, presumed secondary to uterine blood pool as suggested by TCT demonstration of large uterine vessels. This is distinguishable from a positive Meckel's scan due to heterotopic gastric mucosa, in which the appearance of activity is delayed and parallels the accumulation of activity in the stomach.

Case 2: A 16-year-old white female with thalassemia minor complained of periodic aching umbilical pain. Physical examination was unremarkable and all laboratory tests were negative. Pelvic examination revealed a normal-sized uterus slightly deviated to the patient's right. A Meckel's scan was performed and revealed early and intense focal pelvic activity. Sonography at this site demonstrated only uterus and adnexa without evidence of any abnormality. The patient's symptoms resolved uneventfully.

Comment: This case again illustrates early and intense localization of activity by the uterus.

Case 3: A 21-year-old white female presented with a two-month history of rectal bleeding. Physical examination was unremarkable and contrast studies and colonoscopy were normal. A Meckel's scan demonstrated early focal activity confined to the pelvis, diminishing with time (Fig. 2). A laparotomy was performed and no abnormality was found. Because of this patient's previous rectal hemorrhaging it was elected to remove the ascending colon. Final histologic diagnosis was ulcerative colitis.

Comment: This case illustrates early focal activity on Meckel's scan, again presumed secondary to uterine blood pool. Interestingly, in this patient with ulcerative colitis, no uptake was noted in the colon.

DISCUSSION

Meckel's diverticulum represents a remnant of the embryonic vitelline duct, occurring in approximately 1–2% of the general population. This is the most common congenital malformation of

Received Mar. 11, 1981; revision accepted May 27, 1981.

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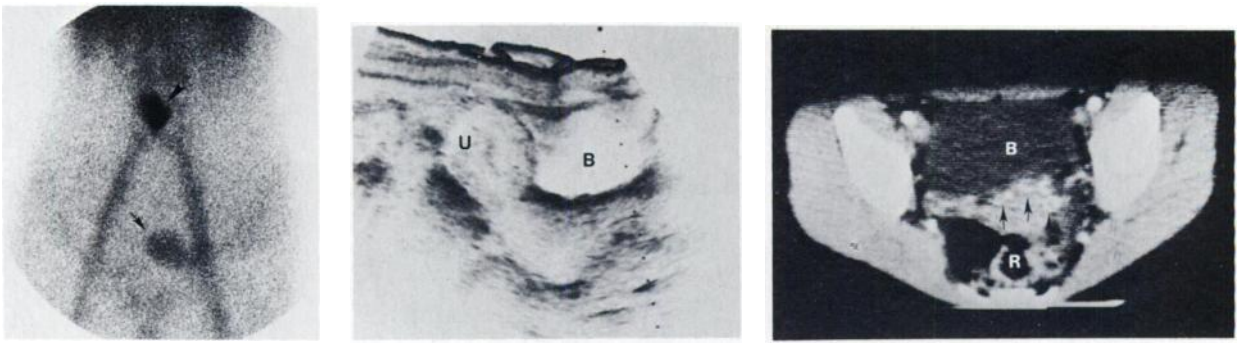

FIG. 1. Scintigram made immediately after injection of pertechnetate (Tc-99m) (left). Intense early activity presents in uterus (arrow) during blood-pool phase. Arrowhead is umbilical marker. Longitudinal sonogram through area of increased activity demonstrates normal uterus (center). U = uterus; B = bladder. Transverse pelvic TCT scan through area of increased activity seen on Meckel's scan (right). Flow study demonstrates large uterine vessels (arrow). B = bladder; R = rectum.

the human gastrointestinal tract. Ectopic gastric mucosa is present in less than 20% of all these diverticula, but occurs in a majority of cases when bleeding is present (*4,5*). Since roentgenographic demonstration has been poor, detection with sodium pertechnetate is currently the most reliable method for diagnosing a bleeding Meckel's diverticulum.

Although the reliability of a radionuclide study for Meckel's diverticulum has been questioned in the past, several reports attest its accuracy (*3,6*). Conway et al. presented a series of surgically proven Meckel's diverticula and concluded that abdominal scintigraphy was 75% sensitive and 80% specific (*3*). There still remains, however, a significant incidence of false-positive scans. Reported causes have included hydronephrosis, abscess, appendicitis, peptic intestinal ulceration, carcinoid tumor, A-V malformations, intussusception, gastrointestinal duplication, abdominal aneurysm, Crohn's disease, Peutz-Jegher's syndrome, sacral meningomyelocele, intestinal lymphosarcoma, appendiceal stump, and feces retained in the cecum (*7–10*).

Our cases illustrate a significant nonpathologic cause of focal pelvic activity during Meckel's scanning which, to our knowledge, has not been reported previously. The focal activity within the uterus probably represents blood pool, most likely on the basis of increased blood flow as suggested by the large uterine vessels noted on the TCT scans seen in Case 1. Blood-pool accumulation of activity in the uterus should be clearly distinguished from uptake by heterotopic gastric mucosa. In the former, activity occurs early during the blood-pool stage and diminishes with time. In contrast, heterotopic gastric mucosa accumulates activity more slowly, paralleling the accumulation noted in the stomach. Furthermore, this activity persists with time. Therefore, when focal activity is seen in a lower abdominal quadrant during a Meckel's scan, and confusion exists as to its origin, ultrasound—and, less frequently, computerized tomography—may be helpful to exclude the uterus as the source.

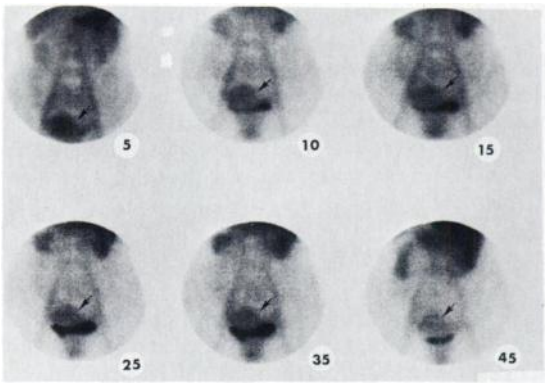

FIG. 2. Sequential scans after pertechnetate injection. Intense early activity in uterus (arrow). As activity in stomach is accumulating, uterine activity is diminishing.

REFERENCES

1. SINGH PR, RUSSELL CD, DUBOVSKY EV, et al: Technique for scanning for Meckel's diverticulum. *Clin Nucl Med* 5: 188–192, 1978
2. CONWAY JJ: Radionuclide diagnosis of Meckel's diverticulum. *Gastroint Radiol* 5: 209–213, 1980
3. CONWAY JJ: The sensitivity, specificity, and accuracy of radionuclide imaging of Meckel's diverticulum. *J Nucl Med* 17: 553, 1976 (abst)
4. YAMAGUCHI M, TAKEUCHI S, AWAZU S: Meckel's diverticulum. Investigation of 600 patients in Japanese literature. *Am J Surg* 136: 247–249, 1978
5. RUTHERFORD RB, AKERS DR: Meckel's diverticulum. A review of 148 pediatric patients, with special reference to the pattern of bleeding and to mesodiverticular vascular bands. *Surgery* 59: 618–626, 1966
6. BERQUIST TH, NOLAN NG, STEPHENS DH, et al: Specificity of ^{99m}Tc pertechnetate in scintigraphic diagnosis of Meckel's diverticulum: Review of 100 cases. *J Nucl Med* 17: 465–469, 1976
7. CHAUDHURI TK, CHAUDHURI TK, CHRISTIE JH: False positive Meckel's diverticulum scan. *Surgery* 71: 313, 1972 (Letter to the Editor)
8. COLBERT PM: Problems with radioisotope scan for Meckel's diverticulum. *N Engl J Med* 291: 530–531, 1974 (Letter to the Editor)
9. WINTER PF: Sodium pertechnetate Tc-99m scanning of the abdomen. Diagnosis of an ileal duplication cyst. *JAMA* 237: 1352–1353, 1977
10. LUNIA S, LUNIA C, CHANDRAMOULY B, et al: Radionuclide meckelogram with particular reference to false-positive results. *Clin Nucl Med* 7: 285–288, 1979