

GASTRIC OUTLET OBSTRUCTION DURING BONE SCAN.

Dr. M.A. Taher

ABSTRACT

A female patient of 40 years was diagnosed to have gastric outlet obstruction during radionuclide bone scintigraphy (Fig.1)

INTRODUCTION

Noninvasive measurement of gastric accommodation and emptying with radionuclide technetium 99 metastable (^{99m}Tc) is feasible.¹ At present, a barostat study is the gold standard, but it is invasive and possibly induces artifacts as a result of positive intraluminal balloon pressure.

CASE REPORT

A female patient of 40 years came for whole body bone scan after left-sided mastectomy due to duct cell carcinoma and desmoplasia. Intravenous injection of 20 milli-Curies ^{99m}Tc MDP (methylene diphosphonate) was given. Blood pool images under Siemens gamma camera were normal, but static views after 3.5 hours showed only non-osseous uptakes in right breast nodule and unusually distended stomach. Ultrasound scan by sonoline SL-2 showed a 9.9 mm hyperechoic nodule in right breast, pockets of small ascites, slow gastric emptying and lower part of esophagus was inflamed.² The patient vomitted during gamma camera scan (static view). The patient complained of anorexia and nausea, but never vomitted before.

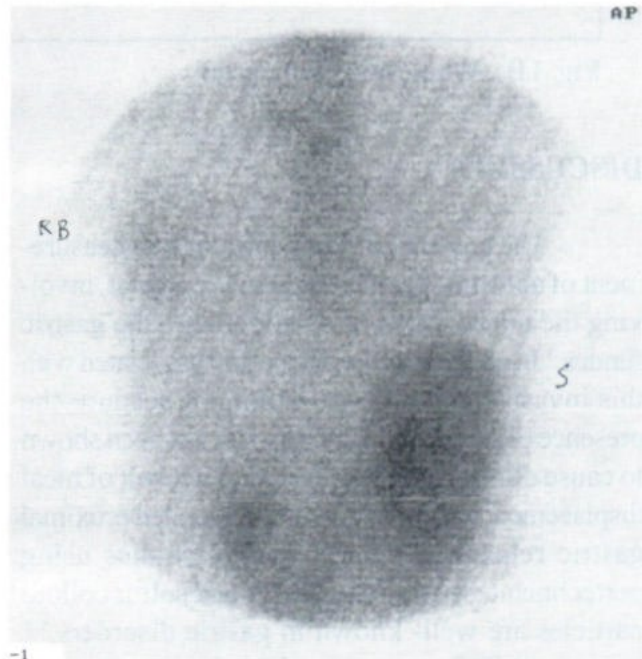


Fig. 1A ^{99m}Tc MDP uptake in stomach (S) and right breast (RB)

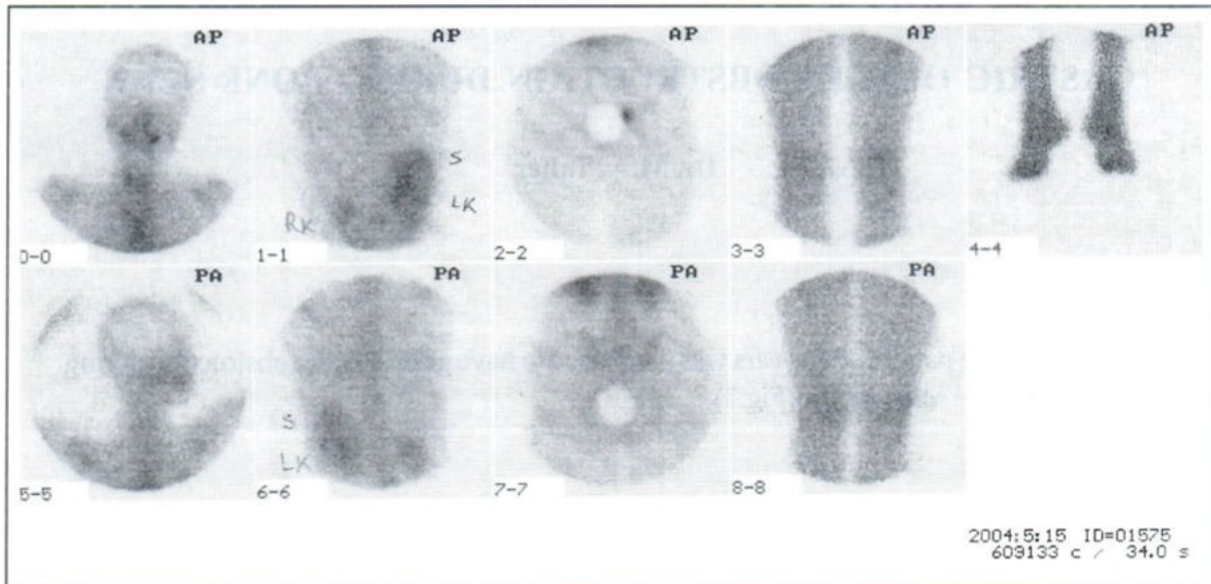


Fig. 1B Whole body bone scan

DISCUSSION

The current gold standard for the measurement of accommodation is the gastric barostat, involving the introduction of a balloon into the gastric fundus.³ In addition to the discomfort associated with this invasive and time-consuming procedure, the presence of a balloon in the stomach has been shown to cause dilatation of the antrum as a result of meal displacement and induction of exaggerated proximal gastric relaxation.⁴ Radionuclide studies using pertechnetate, sucralfate, DTPA and sulfur colloid particles are well-known in gastric disorders,^{5,6} however, MDP was not used for this purpose yet, although non-osseous uptake of MDP during three-phases bone scan is a recognized fact.⁷ The stomach uptake must be distinguished from splenic or renal accumulation.⁸ The mechanism for localization of bone-scanning agents in noncalcified soft tissue, particularly damaged muscle, may be related to movement of calcium from plasma into damaged muscle cells through abnormally permeable sarcolemma.⁹ Other possible mechanisms of soft-tissue uptake include binding to immature collagen and atypical binding of the Tc-99m phosphate to phosphatase enzymes.^{10,11}

REFERENCES

1. Bennink RJ, van den Elzen BD, Kuiken SD, Boeckxstaens GE. Noninvasive measurement of gastric accommodation by means of pertechnetate SPECT: Limiting radiation dose without losing imaging quality. *J Nucl Med* 2004; 45:147-152.
2. Alam MS, Rahman MM, Ahmed AU, Hossain MA, Mohammad J, Mazumder S, Ahmed MS, Ferdousi MA. Evaluation of oesophageal varices with transabdominal ultrasound. *Asian Oceanian J Radiol* 2003; 8: 37-41.
3. Azpiroz F, Malagelada JR. Gastric tone measured by an electronic barostat in health and postsurgical gastroparesis *Gastroenterology* 1987; 92: 934-943.
4. Mundt MW, Hausken T, Samsom M. Effect of intragastric barostat bag on proximal and distal gastric accommodation in response to liquid meal. *Am J Physiol Gastrointest Liver Physiol.* 2002; 283: G681-G686.

5. Puttemans NAM, Andre PP, Jamsin SAMJ, Balikhhan DPH, Lustman F. Detection of gastroduodenal ulcers using technetium - 99m -labeled sucalfate. In Biersack HJ, Cox PH (eds.) Nuclear Medicine in Gastroenterology 139-151, 1991 Kluwer, Dordrecht, the Netherlands.
6. Bares R, Buell U. Gastroesophageal and biliary reflux. In Biersack HJ, Cox PH (eds.) *ibid.*
7. Taher MA. Non-osseous uptakes of Tc-99m phosphonate during three phases bone scanning. ASEAN J Radiol 2003; IX; 139-142.
8. Wilson MA, Pollack MJ. Gastric visualization and image quality in radionuclide bone scanning: concise communication. J Nucl Med 1981; 22: 518-521.
9. Siegel BA, Engel WK, Derrer EC. Localization of technetium 99m diphosphonate in acutely injured muscle. Relationship to muscle calcium deposition. Neurology 1977; 27:230.
10. Jones AC, Francis MD, Davis MA. Bone scanning: Radionuclide reaction mechanisms. Semin Nucl Med 1976; 6: 3.
11. Rosenthal L, Kaye M. Observations in the mechanism of 99m Tc- labeled phosphate complex uptake in metabolic bone disease. Semin Nucl Med 1976; 6: 59.