

# Detection of protein-losing enteropathy by $^{99m}\text{Tc}$ -UBI scintigraphy

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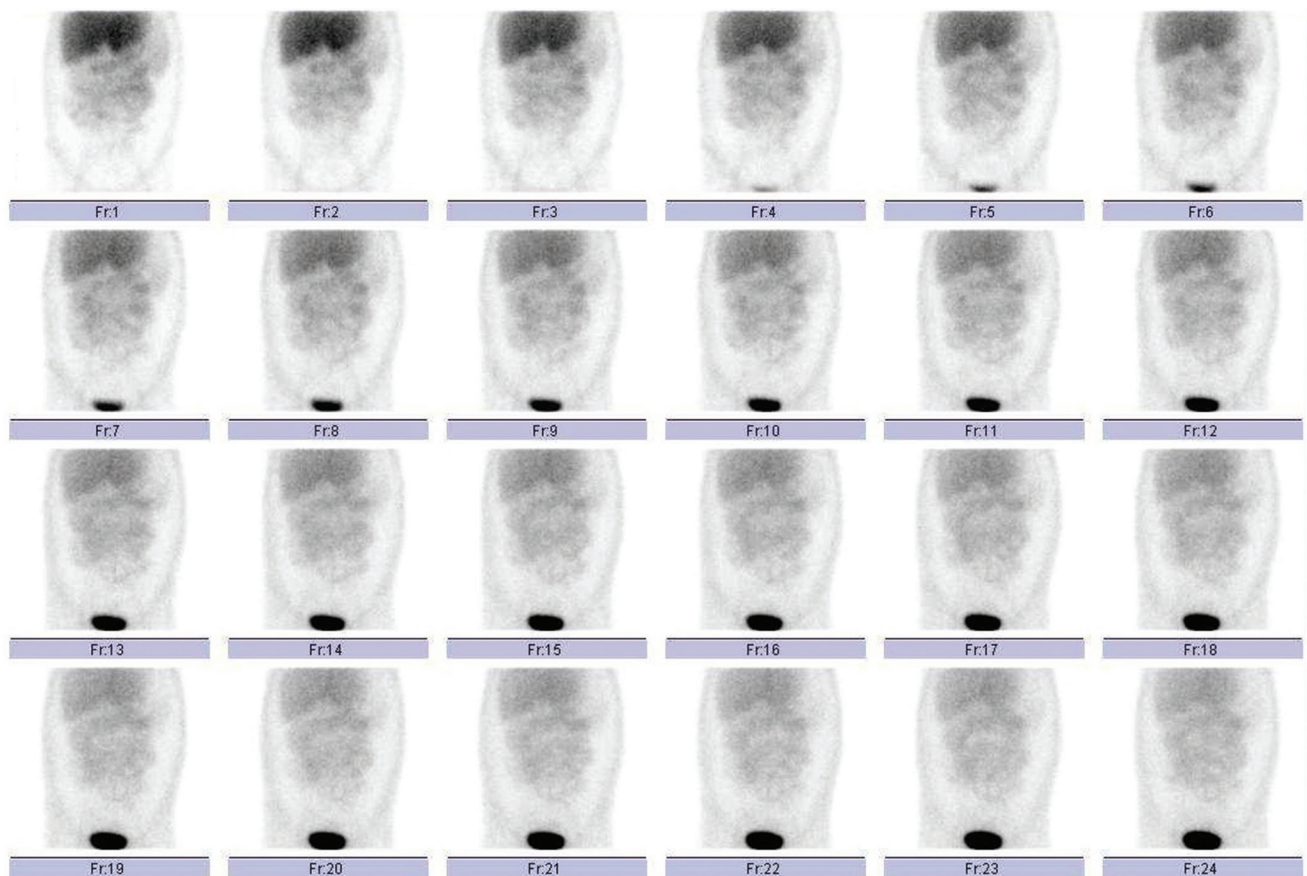
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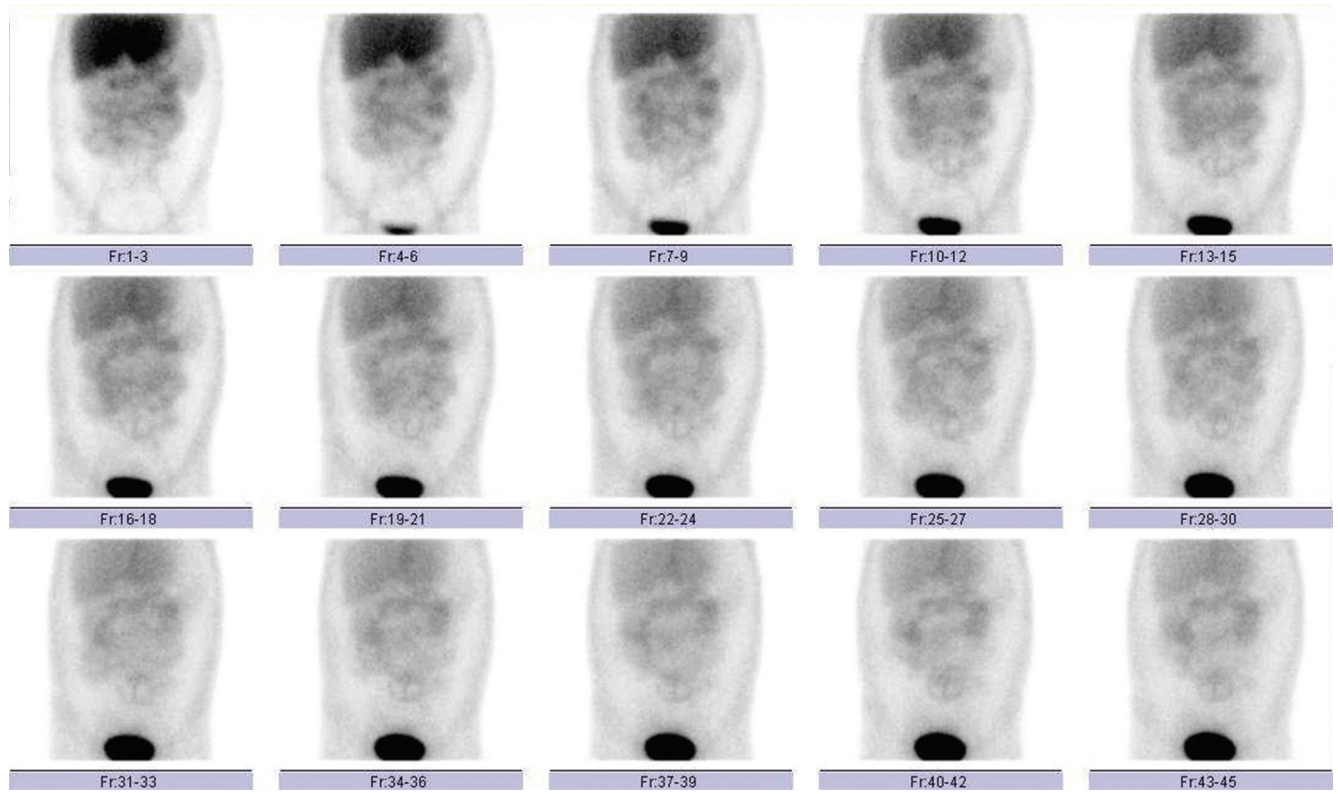
Protein-losing enteropathy (PLE) is a rare complication after the Fontan operation, which was first reported in 1980 [1, 2]. A preliminary review of the experience at the Mayo Clinic reported that the frequency of PLE after the Fontan operation

was approximately 10% [3]. PLE can be detected by increased alpha-1-antitrypsin concentration in a collected stool sample [4]. However, detection of alpha-1 antitrypsin does not show the site of protein loss in the intestine. Furthermore, it will not show

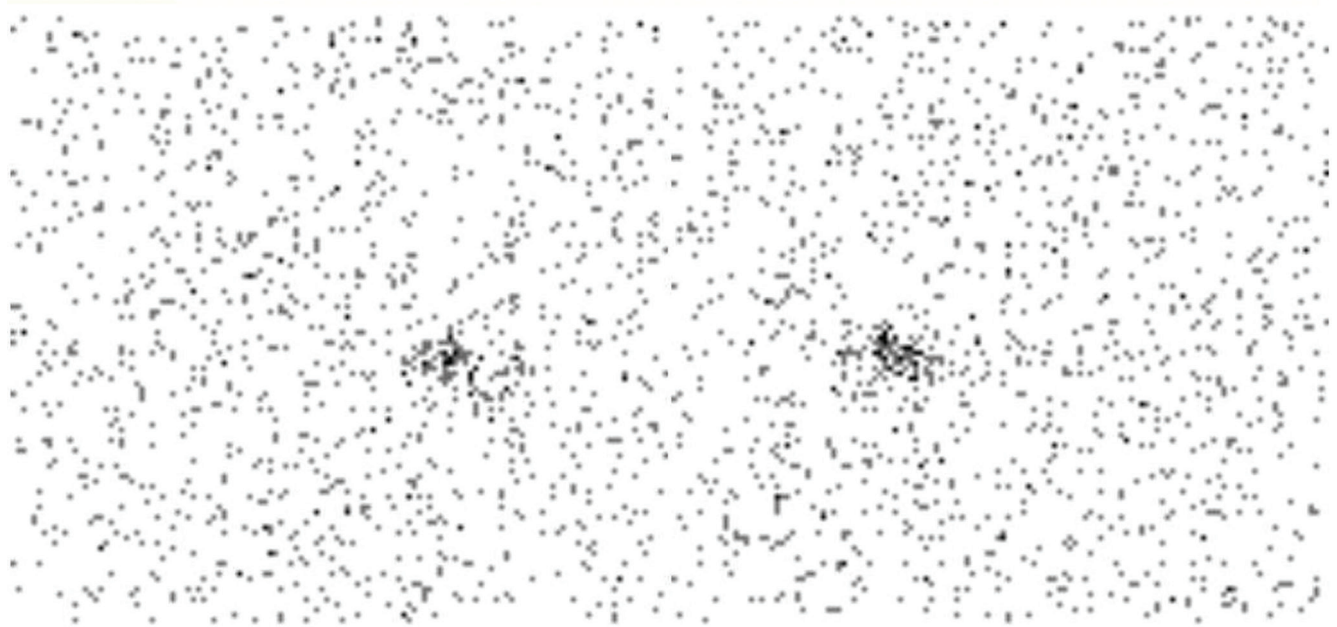


**Figure 1.** A 18-year-old patient with history of complex congenital heart disease (single ventricle, common atrium and large atrial septal defect), who had undergone Glenn and Fontan surgeries 1.5 years ago, was referred for evaluation of possible protein-losing enteropathy by  $^{99m}\text{Tc}$ -UBI scintigraphy. The patient suffered from abdominal ascites, pericardial effusion and unexplained loss of serum albumin. Other causes of hypoalbuminemia were excluded accordingly (including renal, hepatic and cardiac causes). Immediately after IV administration of 740 MBq (20 mCi) of  $^{99m}\text{Tc}$ -UBI, dynamic imaging was performed from the abdominopelvic area using a dual-head gamma camera equipped with low-energy and high-resolution collimator and Tc-99m photopeak. Early dynamic images (2 s per frame) showed immediate appearance of the tracer in the small bowel in the mid-abdominal area (large arrow). The photopenic rim around the mid-abdominal activity is due to ascites (arrows)

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**Figure 2.** Immediately after the perfusion phase, dynamic images were taken (1 min/frame). The anterior view revealed increased tracer uptake in the center of the abdomen again compatible with diffuse small intestine loops location



**Figure 3.** The patient was asked to collect her fecal matter in a bag during the 24 hours after radiotracer injection. The fecal matter was radioactive (arrows) which also confirms the abnormal excretion of the tracer in the gastrointestinal tract

a positive result when the stomach is the place responsible for protein loss [5]. An important advantage of functional imaging is the possibility to localize the site of the protein loss. Several radiopharmaceuticals such as In-111-transferrin, Tc-99m human immunoglobulin, Tc-99m dextran, Tc-99m human serum albumin (Tc-99m HSA), and Tc-99m methylene diphosphonate (Tc-99m MDP) have been used for this purpose [6–8]. Tc-99m UBI is an anti-microbial peptide which can be used for detection of protein loss in the gastrointestinal tract. Our case showed diffuse protein loss in the small bowel and no localized area could be demonstrated, which is compatible with other cases of PLE following Fontan operation. Our case showed the potential of Tc-99m UBI scintigraphy for detection of PLE. To the extent of our knowledge, this is the first report in the medical literature in this regard.

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