Interesting image

Utility of SPECT-CT in the identification of fistulas in a peritoneal scintigraphy

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A 41-year-old woman was diagnosed with chronic renal disease (CRD) due to interstitial nephropathy secondary to chronic pyelonephritis, arterial hypertension and hyperuricemia. She initiated treatment with peritoneal dialysis (PD) in 2007. Four years later she underwent cadaveric kidney transplant in the right iliac fossa requiring transplantectomy 48 h later due to venous thrombosis of the graft. The patient reinitiated peritoneal dialysis. Eight months later she consulted for the progressive appearance of swelling in the right hemiabdomen in the previous 2 months.

On examination important edema was observed in the inferior right hemiabdomen and lumbar fossa with the sensation of stiffness. On suspicion of peritoneal leakage a scintigraphic study was requested for which 150 MBq of $^{99m}$Tc-MAA (albumin macroaggregates) were infused through the catheter in 2 liters of peritoneal dialysis solution (Physioneal 35, glucose 3.86%, Baxter). Early images were obtained at 20 min in lateral and anterior posterior projections in prone and supine positions using a Siemens e.cam dual head gamma camera (Erlangen, Germany). At 4 fours and after the peritoneal lavage, leaving 100 ml of residue, the image sequence was repeated including an image of the thorax to rule out supradiaphragmatic leaks (Fig. 1). A complementary abdominal SPECT-CT study (Fig. 2) was performed in a General Electric Infinia Hawkeye gamma camera (Minnesota, USA). The scintigraphic study showed 2 peritoneal leaks toward the abdominal wall located in the right iliac fossa, lateral to the rectus abdominis in the inferior portion, probably due to unnoticed sections of the peritoneal membrane during kidney transplantation. In view of these results the PD was temporarily discontinued and the patient began hemodialysis through a catheter introduced into the right jugular vein.

The leakage of peritoneal fluid is a possible complication in patients undergoing PD for CRD. Peritoneal scintigraphy with $^{99m}$Tc is a safe procedure and is of great utility in the identification of anatomy-related problems such as ultrafiltration or drainage with diagnostic–therapeutic and prognostic implications in patients with PD. The technological improvements in the current equipment allow precise diagnosis with the use of morphologic-functional hybrid technology which improves spatial resolution thereby allowing the detection of small lesions which are not clearly identified in planar images, independently of the radiotracer used or the localization and nature. Likewise, the hybrid technology improves the anatomical localization of SPECT imaging alone. Despite the planar images detecting a clear pathological deposit in the right iliac fossa and another less clear above the anterior, in the present case the hybrid image allowed precise localization of the foci of activity demonstrating the presence of two leaks to the subcutaneous cellular tissue through the abdominal wall related to the loss of integrity of the peritoneal membrane.
Fig. 1. Planar images of the peritoneal scintigraphy with $^{99m}$Tc-MAA. (A) Anterior view of the abdomen with the patient in a supine position demonstrating abdominal distribution of the radiotracer and beginning to show an accumulation of the radiotracer in the right iliac fossa. (B) Anterior view of the abdomen in prone position after peritoneal drainage showing two foci of activity in the right iliac fossa (continuous and discontinuous arrows). (C) Right lateral view visualizing an intense focus of activity in the inferior region of the right iliac fossa projecting ventrally and which seems to surpass the limits of the abdominal wall (continuous arrow). Above this another focus is observed at the edge of the anterior wall (discontinuous arrow) which does not seem to surpass the wall. In front of the wall (dotted arrow) the residual activity is seen in the abdominal catheter. (D) Anterior view of the thorax demonstrating the absence of mediastinal or pleuro-pulmonary activity thereby ruling out supradiaphragmatic leakage.
Fig. 2. SPECT-CT study. (A) Transverse fusion slices showing foci of increased uptake in the right iliac fossa crossing the anterior abdominal wall toward the subcutaneous space, one more cranial (blue arrow) and another more intense and caudal to the anterior (white arrow). Both are located outside the rectus abdominis thereby suggesting leakage of peritoneal fluid. The CT image shows a heterogeneous image from skin to deep planes laterally to these and in anterior projection corresponding to the laparotomy scar. (B) Transverse, coronal and sagittal fusion slices of the superior fistula. (C) Transverse, coronal and sagittal fusion slices of the inferior fistula.

References

