^{99m}Tc-antigranulocyte antibody scintiscan versus computed tomography and ultrasound in the detection of silent mesh infection of the abdominal wall

To the Editor: Incisional hernias as a defect of abdominal wall on the site of previous laparotomy incision occur in 10% [1]. Up to now, the best results of the incisional hernia treatment have been achieved by non-resorbable mesh hernia repair [2]. Late mesh infections are common complications [3], resistant to conservative treatment which seldom require partial, or more frequently complete removal of the mesh along with residual defect after various sometime multi-staged procedures [4]. Diagnosis of mesh infection is usually set up by clinical examination, and confirmed by ultrasonography (US), computerized tomography (CT) or bacteriology tests. «Silent» mesh infections develope in one half of the patients and can be a diagnostic problem for US, CT and other imaging techniques [3]. Ultrasound and CT can not sometimes differentiate between inflammation and infection in the course of the postoperative healing process and are not of great help in the early stage of the disease when there are still no anatomic changes [5]. In cases where there were no typical clinical signs of mesh infection, we performed scintigraphy using technetium-99m antigranulocyte antibodies (^{99m}Tc-Agc Ab) and compared its diagnostic significance with US and CT [6-9].

Ultrasonography was done with 5- to 10-MHz linear-array transducer (Diagnostic Ultrasound System SDU-2200, Shimadzu, Japan) in supine position of the patient with relaxed and contracted abdominal muscles. Computed tomography of the abdomen was performed using a single-slice spiral CT (SCT 7800 TC Shimatzu, Japan), with a slice thickness of 5mm, or 7mm, after i.v. injection of iodinated contrast by an automatic injector, in the portal-venous phase (80-100mL of the iodinated contrast 300mg I/mL, flow 3mL/s, scanning delay: 50s). Scintimun granulocyte (murine monoclonal antibody, clone 250/183-MoAb BW 250/183), was used, labelled with ^{99m}Tc- pertechnetate. Thin layer chromatography was used for radiochemical purity test. Acquisition was performed using Siemens ECAT scintillation camera after slow i.v. injection of 370MBq ^{99m}Tc labelled monoclonal antibodies BW 250/183 in the cubital vein. Whole body scintigrams (16cm/min) were obtained in anterior and posterior positions 4h after application of the radiopharmaceutical. After initial qualitative analysis, semi-quantitative one followed. After assessment of the increased accumulation of the radiopharmaceutical in the selected area, target-background (T/B) ratio (i.e. the ratio between the area of interest and a similar contralateral abdominal area) was calculated.

Our patient was a 65 years male with right reccurent subcostal incisional hernia without clinical signs of infection as a result of several previous operations, which had as complications wound infection, right subcostal hernia, mesh infection and recurrent incisional hernia (Fig. 1). The ^{99m}Tc-Agc Ab scintigraphy showed a deep mesh infection of the the abdominal wall, in the region of the scar of previous operations; while US and CT indicated no infection (Fig. 2 and 3). Target-background ratio in the anterior scintigram was 3.2. Mesh repair, although followed by good early and late results in comparison to hernia recurrence, always bears the risk of a foreign body infection. Nonresorbable mesh should by no means be used in the presence of abdominal wall defect infection. Components separation technique could be used in contaminated wound conditions providing excellent early results, but with uncertain outcome regarding recurrence.

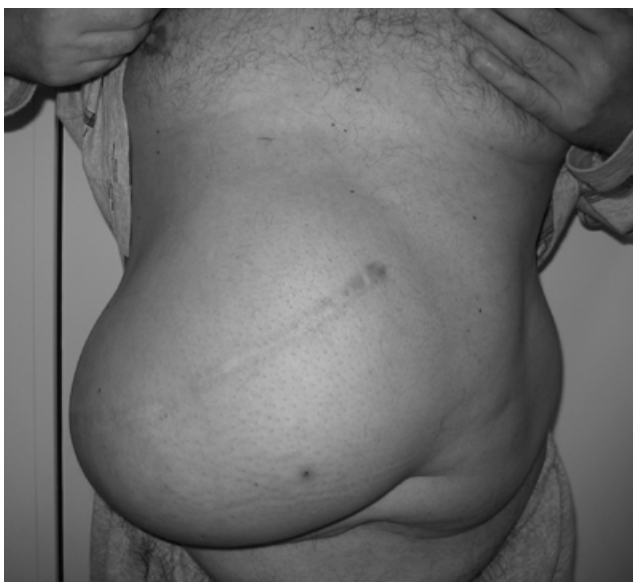

Figure 1. The patient with recurrent right subcostal incisional hernia.

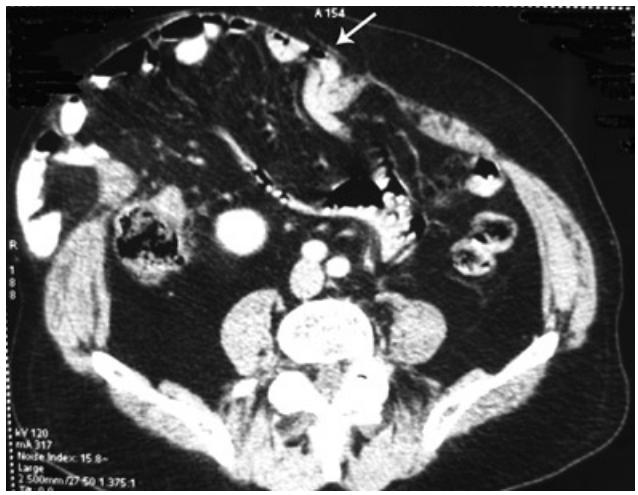

Figure 2. The patient with recurrent subcostal incisional hernia right Computed tomography of the abdominal wall and abdominal cavity showed the reccurent incisional hernia sac containing bowel and residual polypropylene mesh marked by an arrow.

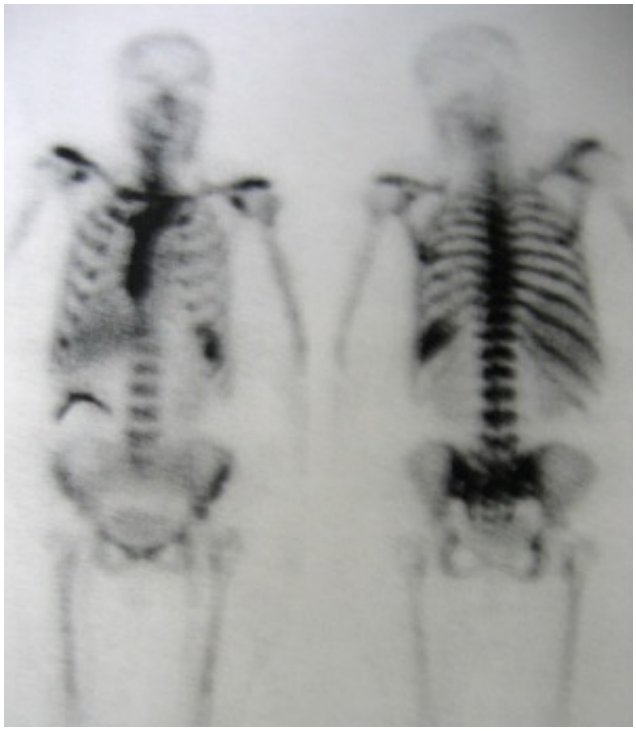

Figure 3. The patient with right subcostal incisional hernia. Radionuclide imaging 4h after application of the radiopharmaceutical, whole body anterior and posterior views: accumulation under the right costal margin, pointing at the infection.

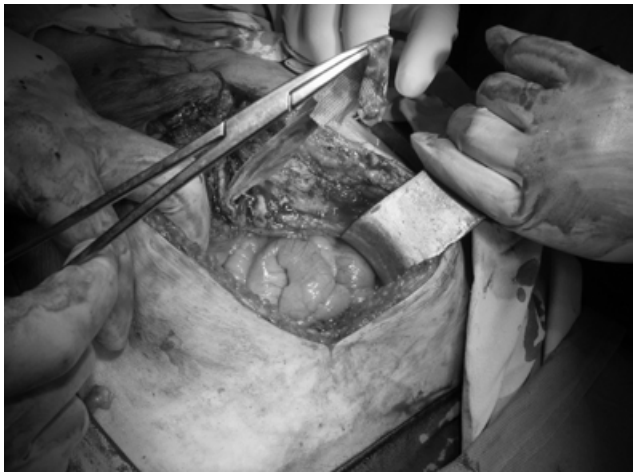

Figure 4. The patient with recurrent right ostal incisional hernia. Recurrent abdominal wall hernial defect and infected polypropylene mesh excision.

The right subcostal recurrent incisional hernia with «silent» deep mesh infection was faced with total mesh excision of the infected polypropylene and combination of various modified components separation techniques: Levine and Karp's (2001) method of "wide myofascial release" [10], the Ennis (2003) method of "open book" modified (CST-Component Separation Technique) [11] and the dissection of the external oblique from the internal oblique muscle (Fig. 4-6). Mesh was infected with staphylococcus epidermidis. Mesh infections can manifest as deep incisional or organ/space infections occurring as early as a few days to several months or delayed, between 3 months to 2 years after surgery or late infections occuring after more than 2 years [3]. The clinical presentation is of crucial significance for determining mesh infection, and techniques such as US and CT are helpful only to confirm the diagnosis.

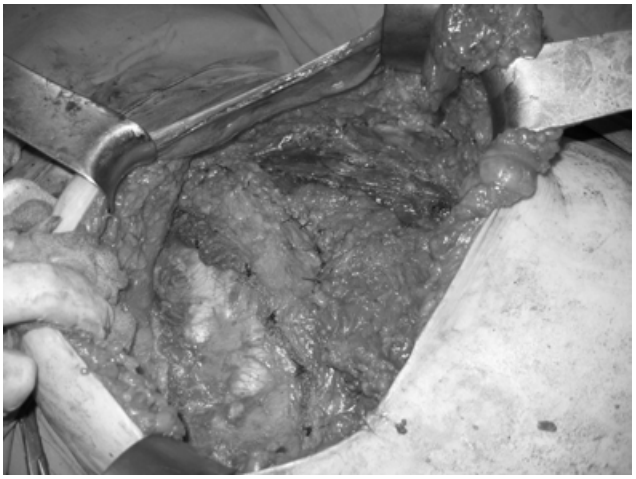

Figure 5. The patient with recurrent right subcostal incisional hernia. Recurrent hernia solved with Levine and Karp's (2001) method of "wide myofascial release" on the right side, Ennis's (2003) "open book" modified components separation technique and the dissection of the external oblique from the internal oblique muscle on the left side.

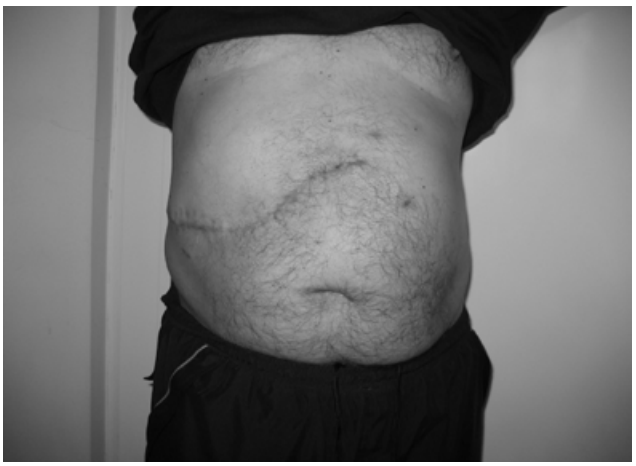

Figure 6. Postoperative findings.

Late deep incisional mesh infections usually manifest as chronic infections with skin pus fistulas in the area of herniaoplasty without larger fluid collections around the mesh. Ultrasound and CT examinations show fistulous canals extending from skin to the infected mesh. However, US and CT are not helpful in determining diagnosis in all cases of "silent" mesh infection. One good solution for "silent" infection diagnosis is scintigraphy with ^{99m}Tc-Agc Ab [6]. There are very few cases reported about this infection following abdominal wall hernia surgery. Certain authors claim that scintigraphy can be used not only to evaluate vascular and orthopedic prostheses, as commonly is, but also to help evaluate prosthetic mesh after incisional hernia repair [12]. This technique should be employed as a complementary technique to CT in differentiating between postoperative inflammation and infection [13]. Late deep incisional mesh infections requiring a complex approach are best treated in specialised hernia centers. The treatment consists of infected mesh excision (most frequently complete) and management of the contaminated abdominal wall defect. There is no optimal solution for this type of abdominal wall defect. Nonresorbable mesh, which is a "gold standard" for major incisional hernia repair, must not be used in case

of infection. Therefore, the surgeon has to make a choice between components separation technique which has excellent functional results, but uncertain long-term results with possible recurrence and the multi-staged procedures which are costly and provide a long-lasting treatment followed by potential complications and doubtful outcome [4, 14-17].

In conclusion, in our patient with recurrent incisional hernia and "silent" deep incisional mesh infection with no clinical signs, scintigraphy with ^{99m}Tc-Agc-Ab was well diagnostic thus enabling promp treatment while US and CT were not.

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