Abstract A 77-year-old woman with a slightly displaced intertrochanteric two-fragment fracture of the left hip was treated by internal fixation using a screw-nail device (gamma nail). After the operation she became hemodynamically unstable, and ultrasound revealed a large retroperitoneal fluid accumulation in the left lower abdomen. A contrast computed tomogram revealed active hemorrhage next to the quadrilateral surface of the left acetabulum. Selective angiography and embolization were immediately initiated and stopped the bleeding. However, despite the successful treatment of the retroperitoneal hemorrhage, the patient developed an oligosymptomatic myocardial infarction associated with clinical evidence of acerebrovascular insult and pulmonary decompensation and died 2 weeks after her accident. The hemorrhage in this patient was most likely caused by surgical damage to the obturator artery during placement of the guidewire pin (with threaded tip) to position the screw of the implant.

Keywords Guidewire pin penetration · Proximal femur fracture · Intrapelvic blood vessel · Fatal hemorrhage · Intra-abdominal compartment syndrome

Introduction

The purpose of this report is to emphasize that the penetration of a guidewire pin used for internal fixation of a proximal femur fracture may injure a major intrapelvic blood vessel with a potentially fatal outcome.
of the internal iliac artery, close to the pelvic brim and quadrilateral surface of the left acetabulum (Fig. 2a). Selective angiography of the internal iliac artery and metal coil insertion successfully stopped the hemorrhage. Thereafter, the patient being stable in the absence of volume substitution, she was referred to the intensive care unit of our hospital. By that time, the patient had received 8 units of blood, 8 units of fresh frozen plasma, and 1 unit of platelets.

The patient recovered initially rapidly; in particular, there were no signs of continuing hemorrhage. The following day, the patient was considered stable enough to be referred back to her own hospital. However, despite the successful treatment of the retroperitoneal hemorrhage, the patient developed in the due course an oligosymptomatic myocardial infarction associated with clinical evidence of a cerebrovascular insult and pulmonary decompensation and died 2 weeks after her accident.

Discussion

The hemorrhage in this patient was most likely caused by surgical damage to the obturator artery during placement of the guidewire pin (with threaded tip) to position the screw of the implant. The ideal proximal placement of a screw-nail device such as a gamma-nail or sliding hip screw is in the center of the femoral head and neck on both anteroposterior and axial views [11]. In this position, the direction of the tip of the screw projects on the anterior quadrants and the center of the acetabulum. At this location, the external iliac artery and the obturator artery run close to the bony surface inside the pelvis and are thus endangered by intrapelvic penetration of surgical instruments [10]. The guidewire pin may have penetrated into the intrapelvic region during its placement, preparation of the screw-hole with the cannulated reamer, or application of the cannulated screw. This complication was lethal in this patient and is inherent to all cannulated implants using a guidewire pin.

Vascular damage after treatment of proximal femur fractures mostly involves extrapelvic branches of the femoral artery [6], while intrapelvic vessel damage is usually associated with pelvic ring fractures [5] or as a complication of total hip replacement [10]. There is only one report of postoperative vascular injury by intrapelvic migration of a threaded Steinmann pin used for the treatment of an undisplaced femoral neck fracture [7]. Intrapelvic penetration during internal fixation of hip fractures has been reported to result in perforation of the bladder [3], rectum [9], and external iliac and femoral arteries [4].

In our case, the finding of a postoperative hemorrhage was highly suggestive of a vascular lesion in the vicinity of the surgical field (left hemipelvis). Since a fall had caused the fracture and the ultrasound examination revealed free fluid in the perihepatic and perisplenic region, a contrast CT of the abdomen and pelvis was performed in the hemodynamically stabilized patient. The extravasation of contrast agent in the left intrapelvic region without signs of active bleeding or lesions of the parenchymatous organs of the upper abdomen assisted in the decision to perform a selective angiography of the internal iliac artery and to embolize the bleeding obturator artery. The time required for this procedure (90 min) was in the range reported in the literature [1].