〈Case Report〉

Two cases of femoral trochanteric fractures with backing out of the compression screw alone: Rare InterTAN complications

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ABSTRACT **Background**: In our hospital, TRIGEN InterTAN nails are used to treat unstable fractures. InterTAN compression screw is always placed against the nail, which makes medial migration impossible, thereby eliminating the Z effect. However, we encountered two cases of InterTAN failure associated with compression screw backout.

Case presentation: An 84-year-old woman presented with a right femoral trochanteric fracture. After internal fixation with an InterTAN short nail, the compression screw was removed during follow-up. A 72-year-old man presented with a left femoral trochanteric fracture. After internal fixation with an InterTAN long nail, the compression screw was backed out and broke. The compression screw was removed and replaced with a new compression screw of the same size after the artificial bone was filled.

Conclusion: We encountered two rare backout cases with only compression screws in InterTAN. If backout occurs, the screw may break if it is not immediately replaced.

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Key words：Femoral trochanteric fracture, InterTAN, Complication, Backout

INTRODUCTION

Most orthopedic surgeons use sliding hip screws (SHS) and/or intramedullary (IM) nails to treat femoral trochanteric fractures. In our hospital, the SHS (DePuySynthes, Dynamic hip screw) and IM nail (Smith & Nephew, TRIGEN InterTAN nail) is used for stable and unstable fractures, respectively. With unique integrated interlocking screw constructs, the InterTAN nail provides stability and resistance to intra- and postoperative femoral head rotation[1)]. This integrated interlocking screw is preferable for insertion in elderly Japanese women with small bones. Furthermore, the InterTAN compression screw is always placed against the nail, which makes medial migration impossible, thereby eliminating the Z-effect[2)]. Here, we encountered two cases of interTAN failure associated with compression screw backout.

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Fig. 1. Preoperative radiograph of case 1.

CASE REPORT

Case 1 is an 84-year-old woman who sustained an intertrochanteric fracture of the left hip (AO/OTA: 31A1.2) after falling at home (Fig. 1, 2). The patient underwent closed reduction and internal fixation with an InterTAN short nail under spinal anesthesia (Fig. 3). The operative time was 95 min, and blood loss was minimal. She was transferred to a nearby hospital for rehabilitation after postoperative day 13, without postoperative complications. However, only the compression screws were removed during the follow-up period (Fig. 4). On postoperative day 59, the compression screw was removed and replaced with a new compression screw of the same size after

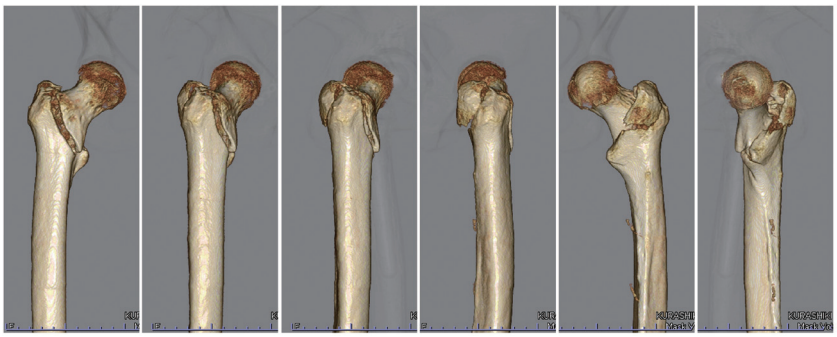

Fig. 2. Preoperative 3D-CT of case 1.

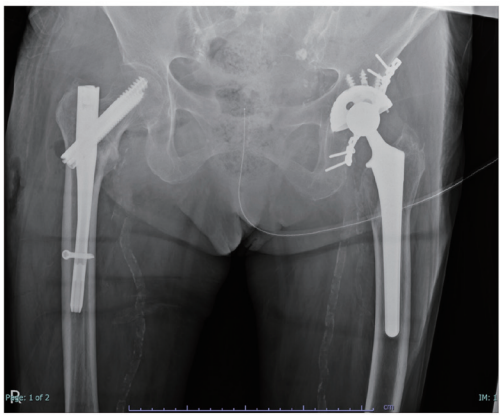

Fig. 3. Postoperative radiograph of case 1.

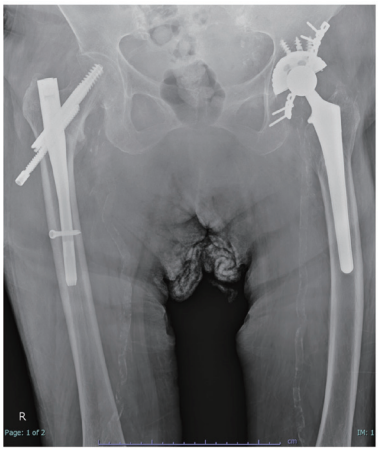

Fig. 4. Radiograph of case 1; compression screw backout.

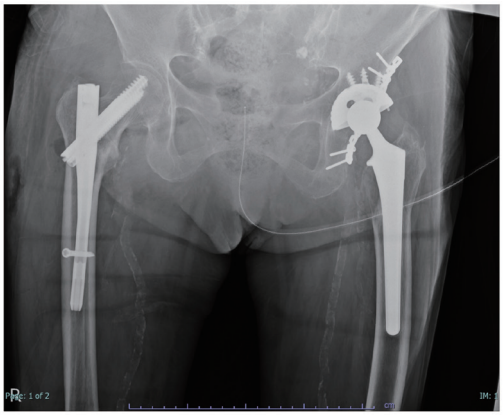

Fig. 5. Postoperative radiograph of case 1. Replaced the new compression screw.

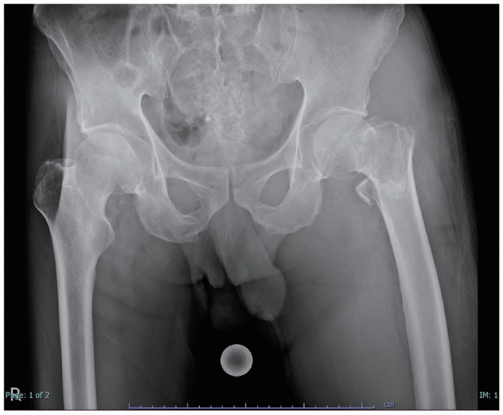

Fig. 6. Preoperative radiograph of case 2.

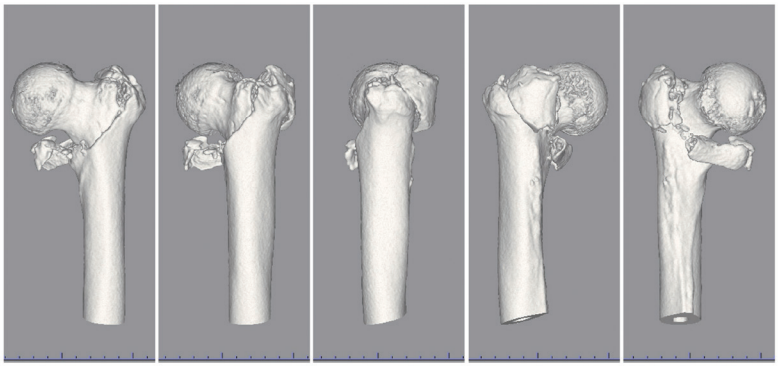

Fig. 7. Preoperative 3D-CT of case 2.

filling the artificial bone (Fig. 5). The operative time was 36 min, and blood loss was minimal.

The patient did well after the second surgery.

Case 2 is a 72-year-old man who sustained an intertrochanteric fracture of the left hip (AO/OTA: 31A2.2) after falling at home (Fig. 6, 7). Five days after the injury, the patient underwent closed reduction and internal fixation with an InterTAN middle nail under spinal anesthesia (Fig. 8). The operative time was 117 min, and the blood loss was 200 mL. The patient was transferred to a nearby hospital for continued rehabilitation after postoperative day 30, without postoperative complications. However, only the compression screw was backed out during the follow-up (Fig. 9).

However, the patient had a stroke two days preoperatively. On postoperative day 74, the patient underwent surgery as his general condition stabilized. Plain hip radiographs were not used during stroke treatment. Under spinal anesthesia, we confirmed that the compression screw was broken using fluoroscopy (Fig. 10, 11). The compression screw stump was grasped with forceps, withdrawn, and replace with a new compression screw of the same size after the artificial bone was filled. The operative time was approximately 60 min, and blood loss was minimal.

After the second operation, there were no major problems; however, owing to the effects of the cerebral infarction, his ADL decreased in the

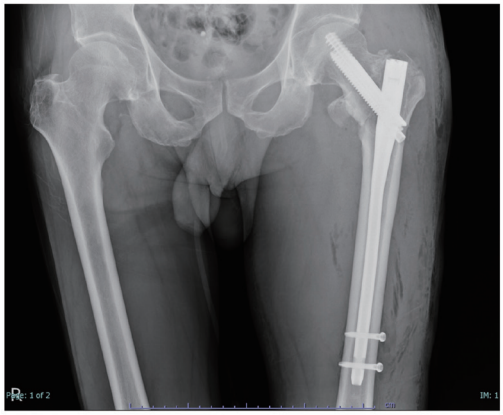

Fig. 8. Postoperative radiograph of case 2.

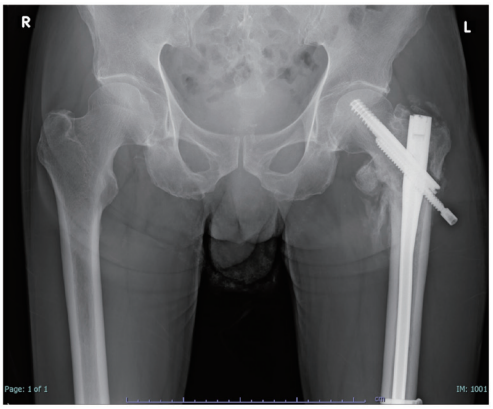

Fig. 9. Radiograph of case 2; compression screw backout.

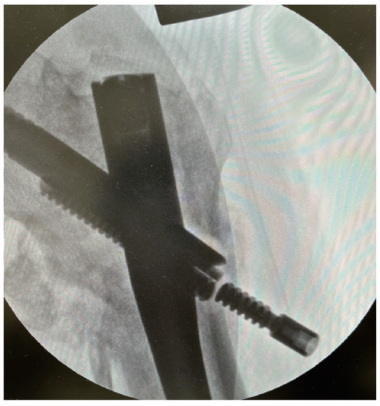

Fig. 10. Radiograph of case 2; compression screw backout is broken.

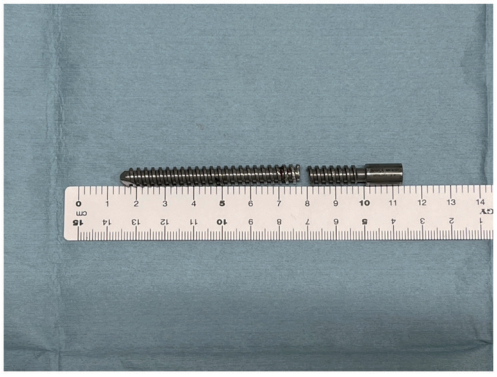

Fig. 11. The broken screw that is removed.

wheelchair.

DISCUSSION

Operative treatment of intertrochanteric fractures were derived from the Gamma nail, passing through dynamic hip screw (DHS), proximal femoral nail (PFN), proximal femoral nail antirotation (PFNA), and progressed to the latest use of the TRIGEN InterTAN nail[3-6]. With unique integrated interlocking screw constructs, the InterTAN nail provides all the benefits of a traditional antegrade intramedullary surgical nail approach and enhances the stability and resistance to intraoperative and postoperative femoral head rotation.

Previous reports have described cut-outs, broken intramedullary nails or screws, and nonunion using the InterTAN[1, 7]. However, there are no reports on compression screws backouts alone. Similar findings have been reported if comparing the results with other implants[8, 9]. We believe that residual instability postoperatively may be the cause of this outcome.

In the AO classification, A1 is stable and A2 and A3 are unstable in trochanteric fracture[10]. In 3D-CT classification, two and 3part G(S) and G(B) are stable; on the other hand, three parts G-L, G(W), L, and four parts are unstable[11]. The treatment of unstable trochanteric fractures requires the selection of long intramedullary nails and precise reduction.

Terada reported the following four conditions for

using long nails; (1) lesser trochanteric fragment ≥ 4 cm, (2) anteroposterior diameter of the medullary canal > 15 mm with large posterior bone fragments, (3) mono-cartical fracture distal to the fracture site, and (4) Stovepipe with a medullary canal diameter of ≥ 15 mm[12].

In case 1, the fracture type was stable (AO/OTA: 31A1.2) on radiography, but unstable (3D-CT: G[W]) on CT. Case 1 may have been an indication for a long nail; however, because the curvature of the femur was large, a short nail was selected.

Case 2 involved an unstable fracture in which a middle nail was selected. The postoperative radiograph of case 1 showed no problems, but the compression screw was insufficiently inserted compared with the lag screw in case 2.

Although there is no documentation in the manual, the lag and compression screws may be engaged at inappropriate times. Such cases need a fix, but this may not have been performed in case 2.

In such a situation, we consider that it was removed because of instability; therefore, we think that it is necessary to replace the compression screw. I would have been excluded if left unattended. Otherwise, the screw may break like case 2.

Although we encountered only two cases, screw replacement was completed successfully by a local procedure without the need to reattach the target device to the tip of the intramedullary nail.

CONCLUSION

We encountered two rare cases of backout with only compression screws in InterTAN. If backout occurs, the screw may break if it is not immediately replaced.

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