

Cerclage Breakage in Trochanteric Revision – High Risk for Hip Endoprosthesis?

Roztržení cerkláže po refixaci trochanteru – vysoké riziko pro osud endoprotézy kyčelního kloubu?

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SUMMARY

We report a 72-year-old man who underwent fixation with a multifilament cerclage system after a peri-prosthetic trochanteric fracture (Vancouver A1). Failure of cerclage occurred after 23 months and revision of trochanteric attachment was performed due to non-union. Intraoperatively fragments of the cable were found between prosthesis head and liner. Cup and head were changed and the greater trochanter was re-attached after allograft-impaction. Based on the present case report multifilament cerclage cables should be used with precaution and might require a close and frequent follow-up given the possibility of cerclage breakage and consecutive catastrophic wear by migration of cerclage particles.

Key words: cerclage, cerclage breakage, greater trochanter, revision.

INTRODUCTION

The management of osteotomies and peri-prosthetic fractures of the greater trochanter is complex and associated with a substantial number of complications. Treatment options include wires, cables, plates and combined systems whereas cerclage techniques are widely preferred (1, 3, 5, 13). Multifilament cables provide a compression force that is two times higher when compared to monofilament wires (8). In addition, multifilament cables do not exhibit kinking as monofilament wires and are applicable in combination with plates (5). Nevertheless, fraying and fragmentation of cables has been reported in several studies and case report (1, 2). Translocation of multifilament fragments to the bearing surface seems to occur more often than in case of monofilament wires (2, 15) resulting in abrasive wear and consequently requires a revision surgery of the implant (2, 11).

The present case report reveals the failure of a multifilament that was used for greater trochanter re-attachment after peri-prosthetic fracture and showed migration of fragments to the articular surface. The aim of this case report is to highlight that fragments of snapped multifilament cerclages can damage arthroplasty implants which might suggest a superior use for monofilament wires in greater trochanter reattachment.

CASE REPORT

A 72-year-old male Caucasian patient received a right-sided hybrid hip arthroplasty in 1993. He presented with a hematoma slightly distal to the right greater trochanter in October 2010 after a fall down the stairs.

Clinical examination did not reveal a shortening or mal-rotation of the right leg and further clinical examination was limited due to pain in the region of the greater trochanter. A slightly displaced fracture of the greater trochanter (Vancouver A1) was apparent on X-rays and therefore we initially agreed on a conservative treatment. However, osteosynthesis with a multifilament cerclage system (Dall Miles) was performed in January 2011 (Fig. 1b) since persistent pain and delayed union was present under the conservative attempt (Fig. 1a).

Nonetheless, pain was persistent even 23 months after surgical management but cerclage breakage was evident for the first time on X-rays (Fig. 1c) whereas a CT-scan 7 months earlier was negative for any failure.

A revision surgery of the hip was performed by the senior author (AMN) in January 2013 with removal of the destructed cerclage and the acetabular cup (Fig. 2).

Noteworthy, the cerclage failure was not present adjacent to the clamp or opposite to the cutting site of the parallel cable (Fig. 3). In addition, cerclage fragments were found within the PE-surface inside the cup (Fig. 4) with several scratches on the bearing surface.

The acetabular cup required a replacement by an acetabular revision ring due to a central acetabular defect. The residual greater trochanter shell was augmented with allograft (cancellous chips and demineralized bone matrix) after careful debridement. Fixation was performed by applying two multifilament cables and K-wires without the use of screws or grip plates in order to prevent damage of the fragile trochanteric fragments (Fig. 5a).

Bone consolidation was evident on follow up X-rays and was confirmed during the metal removal operation 1 year later (Fig. 5b). In August 2014 the patient complained of occasional peritrochanteric pain without requiring pain killers on a regular basis. The patient was perfectly satisfied since he was able to walk for 30 minutes without crutches and no signs of hip abductors insufficiency.

DISCUSSION

K-wires has widely been reported for migration into structures such as the aorta (6) or the lung (4) and even for long distance

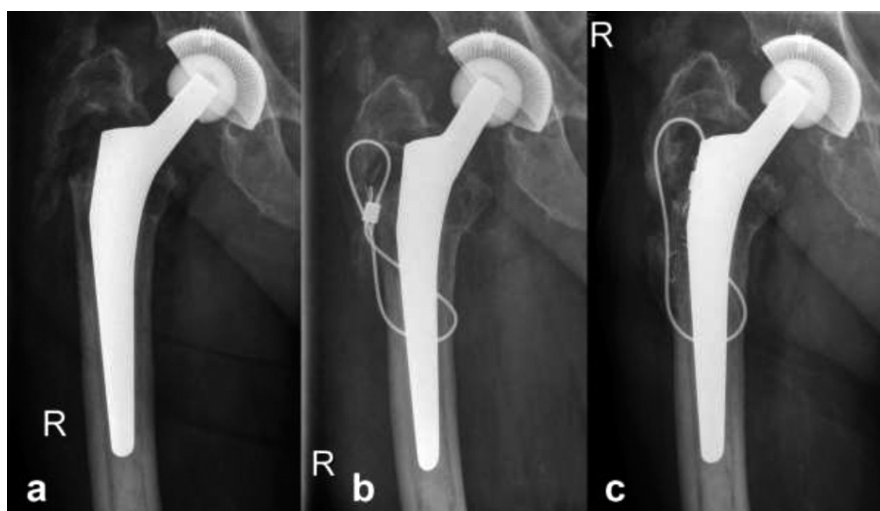


Fig. 1. Fractured greater trochanter without loosening of the stem seven weeks preoperatively (a). Five days after osteosynthesis (b). 23 month after ORIF cerclage breakage is apparent with non-union of the greater trochanter (c).



Fig. 2. Removed broken cerclage cable and cup.

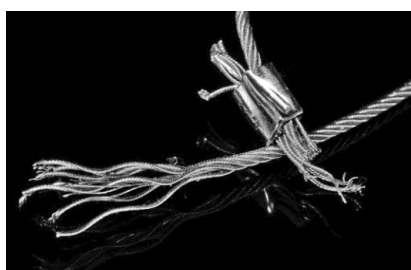


Fig. 3. Close-up of the broken multifilament cable.



Fig. 4. Close-up of the PE-liner with cable fragments on the surface and within the PE.

migration, such as from the pelvis into the heart (7, 10). In comparison, reports of migration cerclage wires are less common. The widely used Dall Miles multifilament cables are provided in 1.6- and 2.0-mm-diameter. The stability of these multifilament cables is about twice as much a 1-mm-surgical chrome wire (8). Furthermore, kinking of the cable is prevented by its elasticity. That is of interest, since kinking is a well known risk factor for cerclage breakage and has to be avoided (9). Another advantage of multifilament cables is that the process of tensioning is much better controlled (5). Two 1.0-mm-wires provide about the same compression as one Dall Miles-cables with 1.6- or 2.0-mm-diameter (8). However, this study did not provide evidence how wires and ca-

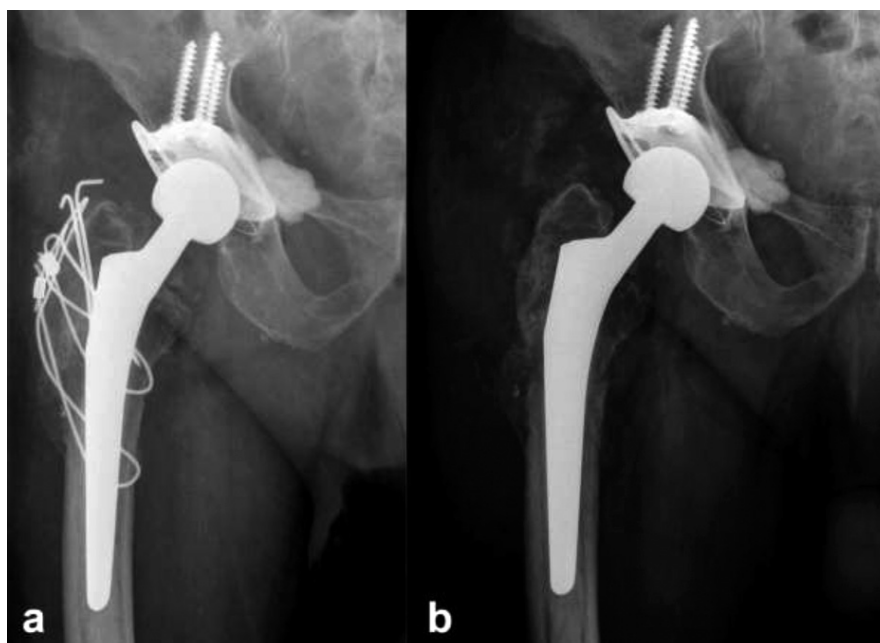


Fig. 5. Postoperative after change of cup and re-ORIF (a). X-ray control 1 year post-operative with removed cerclage and consolidated pseudarthrosis (b).

bles behave in a tension band-setting as in trochanteric ORIF. Teanby et al. compared the outcomes of Dall Miles cables to double-wires with no significant difference for trochanter separation or cerclage breakage (14).

The application of the cerclage requires a proper technique and is a crucial point for the stability. McCarthy et al. outlined that the bone-to-bone contact of the distal and proximal fragments is important for a steady trochanteric re-attachment (9). Thus, a prominent high cement mantle around the lateral prosthesis shoulder gives rise to a reduced bone-to-bone contact as well as bone loss at the fracture site. The close contact of the fragments cannot be provided even by the best allograft. Ritter et al. pointed out that cable failure can be prevented by wrapping the cable around the femur just distal the lesser trochanter instead of placing drill holes through bone and cement (12). The latter could lead to cable-prosthesis-contact resulting in corrosion and cerclage breakage. Small fragments compared to larger ones seem to be more likely to migrate towards the articular surface in case of cerclage breakage which is connected to a higher risk of accelerated abrasive wear.

To our knowledge, no study provides evidence whether double wire fixation is superior to single wire for trochanteric osteosynthesis in revision surgery even though the above mentioned literature suggest that it might provide more strength. Thus, wire fixation should be based on the preference of the surgeon.

We strongly recommend to follow-up the patients at least every 6 months up to 2.5 years if multifilament cables are used. These suggestions are based on the fact that cerclage cables break frequently and mostly in the range of 3 to 23 months postoperatively with a mean of 18 months (9).

CONCLUSIONS

Based on the current case we recommend a management with monofilament wires for trochanteric refixation.

We advise the removal of the cables with local debridement regardless of union or non-union of osteotomy- or fracture-sites and the investigation of bearing surfaces whenever a cerclage failure occurs. Hence, cerclage-fragment migration and consecutive catastrophic wear could be prevented.

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