

Short-Term Results on the Use of Non-Metallic Cerclage in the Treatment of Peri-Prosthetic Femoral Fractures

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Introduction: Metallic cerclage systems (monofilament, multifilament, and plate/cerclage systems) are economic means of bone fixation and are widely used in orthopedic surgery. Nonetheless, numerous complications correlated with their use have been described in the literature, including the release of debris, breakage with subsequent migration of fragments, loosening of the wire (loss of compression), allergic reactions, and skin injuries to the operating staff¹. This study describes the short-term results of the use of a non-metallic iso-elastic cerclage cable (made of nylon and UHMWPE) in the treatment of peri-prosthetic femoral fractures.

Materials and Methods: 14 patients (11 women and 3 men) with peri-prosthetic hip fractures underwent surgery at our Institute between September 2018 and April 2019. Using the Vancouver classification, the fractures were diagnosed as type B1 in 12 cases and type C in 2 cases. The average age of the patients was 83 years old (78–90). Patients with Vancouver B2 fractures with revision of the femoral prosthetic component indicated were excluded from the study. In all cases, non-metallic iso-elastic cerclage (nylon + UHMWPE) was used either alone or with special plates. The surgery technique involved positioning the patient in a lateral decubitus position, giving lateral access to the femoral fracture. The patients were clinically assessed and x-rayed immediately post-operation and thereafter at 1, 3, and 6 months.

Results: No cases of breakage or failure of the fixation method that could be seen during check-ups were reported. The average time patients were advised not to bear weight on their hip was 21 days (14–38). Rehabilitation protocol was followed in all cases at specialised partner institutes. No cases of serious complications such as secondary displacement or pseudarthrosis were observed. There was one case (7%) of a superficial infection from the surgical scar, which was treated with antibiotics and debridement. In one patient (7%) the hip prosthesis dislocated during rehabilitation, which was resolved by non-invasive reduction. During the surgical operations, performed by the same team, no accidents occurred to the operating staff that could be attributed to the procedure of applying this means of fixation. There were no complications directly attributable to the cerclage material.

Conclusions: Metal alloys are widely used in cerclage cables^{2,4}: they make fixation materials reliable, have low immunogenicity, and guarantee good recovery rates. Nevertheless, they have some disadvantages, such as biomechanical wear, loss of compression over the long term due to plastic deformation^{5,6} and a higher risk of accidents to the surgical team. Non-metallic cerclage cables made of nylon and UHMWPE have better biomechanical properties than traditional implants in terms of resistance to wear and structural damage^{3,6}. They are therefore a promising fixation method that ensures good short-term stability, reliability, high recovery rates and lower complication rates than traditional metallic cerclage cables. The preliminary results are encouraging. However, it is necessary to expand the study population and monitor the medium- and long-term effects of the treatment.

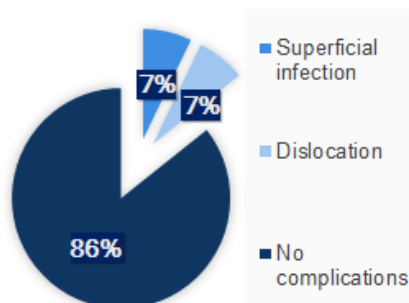


Fig. Post-operative complications

References

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3. *Clin Orthop Relat* 2010. Early experience with a novel nonmetallic cable in reconstructive hip surgery. Ting NT, Wera GD, Levine BR, Della Valle CJ.
4. Abdel MP et Al. Epidemiology of periprosthetic femoral fractures in 5417 revision total hip arthroplasties: a 40-year experience. *Bone Joint J*. 2016.
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6. Rothaug PG et Al. A comparison of ultra-high-molecular weight polyethylene cable and stainless steel wire using two fixation techniques for repair of equine midbody sesamoid fractures: an in vitro biomechanical study. *Vet Surg*. 2002;31(5):445-454.

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References

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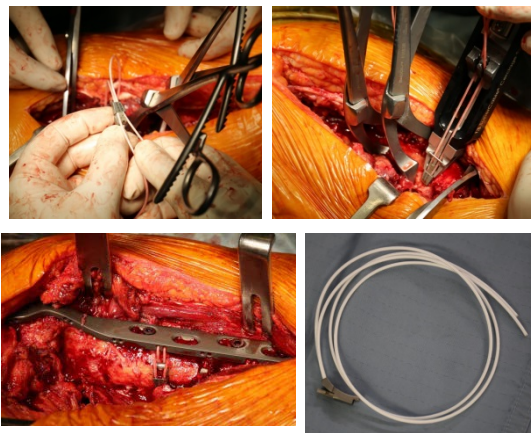


Fig. 1 Surgical Technique



Fig. 2 X-rays pre- and post-operation and 30 days after. Patient: 83-year-old female with Vancouver B1

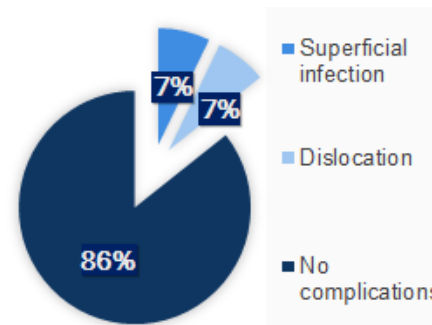


Fig. 3 Post-operative complications