

Local innovation dialogue event

Organised by Lithuanian University of Health Sciences (LUHS)

2 October 2018

Summary

At the local innovation dialogue organised by the Lithuanian University of Health Sciences, 'implant alignment in proximal femoral fractures' and the treatment of local biofilm in infected fractures were important topics of the discussion.

Implant alignment in proximal femoral fractures

Hip fractures are the most common fractures in the elderly and have consequences extending into the domains of medicine, rehabilitation, psychiatry, social work and medical economics. Hip fracture patients are related with high morbidity, decrease in quality of life and high mortality ranging from 14 till 58%.

Proximal femoral fractures in absolute majority of patients are operated. If the fractures are fixed/osteosynthesis performed, the alignment of implants is very important together with anatomical reduction of fragments. Precise placement of implants is related with greater stabilisation and may prevent from loss of fracture reduction, thus surgical failure.

Preparation of screw implantation is usually starting with introduction of guide wire. If it's malaligned the final implantation will be not precise. The guide wire is entered from lateral cortex of the proximal femur and by eye directed to the femoral head under the fluoroscopy control. The entering angle may vary depending on individual patient anatomy or the type of the implant. The placement of initial guide wire could be enhanced if the surgeon could see where the wire will be before the insertion.

There are numerous reports/guidelines in infection prevention/treatment strategies, however, with a huge variability between continents, countries or even hospitals. This may be affected by the lack of randomised controlled trials in infection field, as it is may be bioethically difficult to approve them. This makes large cohort studies crucial. Countries with implemented well defined infection prevention/treatment algorithms may have significantly lower infection rates as compared to countries which have no algorithms established on national level. This can be evaluated in international collaboration projects.

There is a need to improve an accuracy of implant placement in femoral neck.

- REDUCE – the number of fluoroscopic images/fluoroscopy and operation time.

- ELIMINATE – implant malalignment.
- STRENGTHEN – the improvement of accuracy of implant placement in femoral neck and prevent from loss of fracture reduction.
- CREATE – a device which could be fastened to any power tool and being parallel to original guide wire but prolonged on the top of the patient like an arm. It could be a cheap alternative as compared to navigation systems.

Local biofilm treatment

Implant-related infections after fractures often requires repeated surgeries, hospitalisations, are related with secondary complications, sometimes amputations, chronic morbidity, and mortality related to the systemic antibiotic treatment and immobilisation. Infected fractures or pseudoarthrosis requires both fracture fixation and infection treatment. This is compromised as long as the foreign material is present, together with conditions to form a biofilm.

The usual strategy in early stages is a suppression of bone infection and removal of implant as soon as fracture is healed. In complicated cases bone healing could be prolonged and suppression alone could be insufficient, thus require biofilm-active therapy. However, local antibiotics in bone cement can interfere with polymerisation process (e.g. rifampin or metronidazol) or which are not thermostable or sensitive to oxidation (e.g. some beta lactams) and cannot be used.

Fighting the biofilm locally could enhance the treatment of infected fractures.

- REDUCE – the failure rate of infection treatment.
- STRENGTHEN – support systemic antibiotic therapy with biofilm-active therapy.
- CREATE – a local antimicrobial delivery/possible carriers for biofilm-active or supportive therapy.

