

INTERVIEW

“For patients over 70 years of age, the ultimate goal is a pain-free implant and no re-operation for the rest of their lives.”

Prof. Anke Eckardt, specialist in orthopaedic surgery, shares her protocol in cemented hip arthroplasty.

In Switzerland in hip arthroplasty very few hip stems are cemented. Despite this, why do you advocate the use of bone cement, particularly in older female patients?

Surgeons in orthopaedics and trauma should bear in mind: "Primum nil nocere" - the most important thing is to do no harm.

Looking at elderly patients, we know that there is an increased risk of intraoperative and postoperative periprosthetic fracture. We know that there is an increased rate of aseptic loosening and associated revision of uncemented stems. As surgeons, we should do everything possible to minimize the risks associated with total hip arthroplasty for our patients.

In elderly patients the result of an intervention following a fractured neck of femur or early or late revision comes along with significantly increased risk than in primary arthroplasty. Bayliss and colleagues have calculated that once you have reached 75 years of age the "lifetime risk of revision" after hip arthroplasty is less than 5%.

This means, if the original procedure is performed well, most patients will never require revision surgery.

For our patients over 70 or 75 years of age our ultimate goal is therefore no re-operation for the rest of their lives, hopefully with a good quality of life. In other words, a pain-free implant, the so called “forgotten hip”.

Why is it important for a total hip replacement to have a long lifetime?

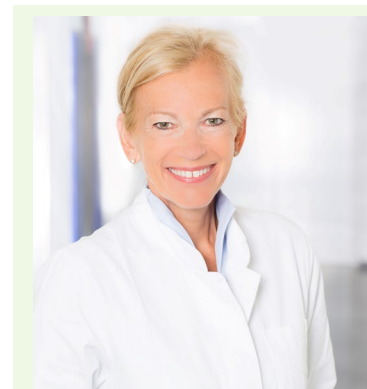
As mentioned earlier, a complex revision or a periprosthetic fracture (which often requires a re-operation) can put the elderly patient in a critical health situation, especially if the patient has co-morbidities. Rehabilitation becomes more difficult with increasing age. Often, persistent pain or muscular insufficiencies result in the need for care and restrict the independence of patients and their quality of life.

In recent times the cemented stem has appeared to fall out of relevance. How do you see the latest evidence for its use in total hip replacement?

It is of great relevance! Undoubtedly and according to many studies and registry data over a very long period of time, uncemented stems increase the risk of periprosthetic fracture in osteoporotic patients. The fact that recommendations are now being made accordingly in various registries is just a logical

consequence. Orthopaedic and Trauma societies in the Netherlands, Denmark, the United Kingdom, Italy, and also in Germany suggest that cemented fixation of hemiprostheses should become mandatory.

This recommendation has probably been overdue and must be considered, accepted, and implemented by the orthopaedic community, too. In 2013, Troelsen and colleagues labeled this phenomenon the "Uncemented Paradox". People are aware of the problem but act differently.



PROFESSOR ANKE ECKARDT, MD
Hirslanden Klinik Birshof, Switzerland

Bunyoz and colleagues recently published again on this topic “The Uncemented Paradox Revisited”, so it does not seem much different today. Meanwhile in Sweden 24% of primary interventions are cementless, but in Denmark there are still 71%.

At this point it is necessary to teach young colleagues the habits of good cementing technique. Some even speak of a "lost art". The choice of implant in arthroplasty must not be based on supposedly shorter operation times or even driven by pressure from the implant manufacturers. The patient's well-being must be the only consideration in place. Once again we see the ultimate goal: no revision in the old patient, for the rest of their life!

From your perspective, why should the risk of femur fracture be reduced at all costs?

A fracture of the femur is always a disaster for the patient, be it intra- and postoperatively. Only a femoral fissure that is detected intraoperatively is easy to manage.

Considering this, it is essential to keep the risk as low as possible. There are so many patient-related factors that we cannot influence. But we should exploit our means to contribute to prophylaxis, primarily through the choice of the implant and appropriate surgical techniques.

What criteria do you use to determine an increased risk of periprosthetic femur fracture in your patients intraoperatively and postoperatively?

Relevant pre-existing conditions are recorded for all patients: diabetes, cardiopulmonary diseases, obesity, but also - especially in the elderly patient - malnutrition, sarcopenia, osteoporosis, renal insufficiency, neurological disorders, cognitive impairment, all of which are associated with an increased risk of falling. As well as anxiety disorders and depression which often require the use of centrally active psychotropic drugs. These can lead to declined motor skills and limited reaction and can influence vigilance issues.

A delirium assessment is performed and alcohol consumption and psychotropic drug use are recorded. Avoiding perioperative sedation and general anesthesia is essential. Moreover, measures for fall prevention must be planned, and if necessary, postoperative monitoring must be organized. Cementless stems carry not only a significantly higher intraoperative fracture risk but also a higher postoperative risk due to (design-dependent) periprosthetic bone remodeling (Hailer 2010).

In the much-cited paper by Thien and colleagues which evaluated over 430,000 hip replacements from the Nordic Arthroplasty Registry, the risk of periprosthetic fracture in women over 70 years of age with uncemented hip stem fixation is 10 times higher during the first 6 months postoperatively compared to a cemented fixation, and continues to be 7 times higher over the first 2 years.

Similar results are shown in other papers (Carli et al. and Mäkelä et al.): 27% of revisions during the first 6 months had to be performed in patients with cementless prostheses due to periprosthetic fractures, while only 4% of cemented implants

required revision. Stea and colleagues also reported the highest risk of revision in patients older than 75 years of age when cementless implants were used.

In Denmark, Lindberg-Larsen and colleagues showed an increased femoral fracture risk with cementless stems (Risk Ratio (RR) 4.1), diagnosed osteoporosis (RR 2.8), female gender (RR 1.6), and age (1.4% per every 10 years) regardless of the stem design chosen (Tanzer et al.).

These are the risk factors that we have to think about when choosing an implant in addition to the comorbidities mentioned earlier, along with the general condition and medication history of the patient.

Of course, we also look at the X-ray. A low Door type femur with "Stove-Pipe" geometry with thin cortical bone requires no further consideration. The Stem should be cemented.

There are still colleagues who fear an increased intraoperative cardiopulmonary risk during cementing due to fat embolism. With the correct cementing technique utilizing jet lavage, this risk is not greater than the risk associated with broaching for cementless implants.

"It is necessary to teach young colleagues the habits of good cementing technique."

Severe cases of "Bone Cement Implantation Syndrome" occur only very rarely and almost exclusively in elderly patients who have significant pre-existing conditions, i.e. ASA III/IV, renal insufficiency etc. (Rassir et al.) and usually only in unplanned femoral fracture procedures when the patients could not be prepared accordingly. What is helpful in these high-risk patients apart from good cementing technique is the good cooperation and consultation between the surgeon and the anaesthetist.

The argument that cemented stems are revised earlier and have shorter survival has undeniably been proven wrong over a long period of time through the results such as in Sweden, and has been proven false by much registry data and studies on the elderly patient. A well-cemented stem usually outlasts the life expectancy of elderly patients, for whom - once again - the primary goal must be to create a pain-free result, good quality of life and to avoid re-operation for reasons including a periprosthetic fracture, early loosening or non-integration of a cementless stem for the remainder of the patients' life.

In the meantime, this fact has also been documented and analyzed accordingly by the German Arthroplasty Registry (EPRD). The "failure probability" within 2 years after initial implantation is 3.7% for cementless, but only 2% for cemented

“As surgeons, we should do everything possible to minimize the risks associated with total hip arthroplasty for our patients.”

implants. Periprosthetic fracture as the cause for revision occurs in 18% of cementless implantations, but only in 5% of hybrid implantations with cemented stems.

In a prospective study, Fernandez and colleagues found an increased quality of life and a lower risk of periprosthetic fracture in patients over the age of 60 with femoral neck fracture undergoing cemented hemiarthroplasty rather than a cementless procedure.

The authors of the German Arthroplasty Registry therefore consider it advisable: "...to use stem cementation more frequently in older patients."

Only in a few countries are uncemented stems used as frequently in older patients as in Germany and Switzerland. However, the trend toward cementless treatment has fortunately been declining again recently in some countries (Bunyož et al.).

What is the role of antibiotic-loaded bone cement in preventing risks after hip TEP?

In the elderly patient with osteoporosis and at an increased risk of falling the use of bone cement is undoubtedly associated with the reduction of peri- and postoperative fractures and consequently a lower revision risk. Additionally, the use of antibiotic-loaded bone cement defends the patient from infection (Colas et al JAMA 2015, Leong et al Bone Joint J 2020) as the risk of infection is clearly reduced - according to a study by Sanz-Ruiz and colleagues (J. Arthroplasty 2016) up to 72.6% - and does not have side effects.

In the USA, where antibiotic-loaded bone cement has not been used for a long time, the data now paints a clear picture: antibiotic loaded bone cement is universally recommended even for primary arthroplasty (Bendich et al JBJS 2020). In a meta-analysis with over 370,000 hip and 670,000 knee prostheses, Farhan-Alanie et al (Bone Joint J 2021), were able to prove that the addition of antibiotics to cement does not increase revision risk.

Thank you, Professor Eckardt, for this interview.

Literature

Bayliss et al. (2017): The effect of patient age at intervention on risk of implant revision after total replacement of the hip or knee: a population-based cohort study. In: *Lancet (London, England)* 389 (10077), S. 1424–1430. DOI: 10.1016/S0140-6736(17)30059-4.

Bendich et al. (2020): Antibiotic-Laden Bone Cement Use and Revision Risk After Primary Total Knee Arthroplasty in U.S. Veterans. In: *The Journal of bone and joint surgery. American volume* 102 (22), S. 1939–1947. DOI: 10.2106/JBJS.20.00102.

Bunyož et al. (2020): Has the Use of Fixation Techniques in THA Changed in This Decade? The Uncemented Paradox Revisited. In: *Clinical orthopaedics and related research* 478 (4), S. 697–704. DOI: 10.1097/CORR.0000000000001117.

Carli et al. (2017): Periprosthetic femoral fractures and trying to avoid them: what is the contribution of femoral component design to the increased risk of periprosthetic femoral fracture? In: *The bone & joint journal* 99-B (1 Suppl A), S. 50–59. DOI: 10.1302/0301-620X.99B1.BJJ-2016-0220.R1.

Colas et al. (2015): Association Between Total Hip Replacement Characteristics and 3-Year Prosthetic Survivorship: A Population-Based Study. In: *JAMA surgery* 150 (10), S. 979–988. DOI: 10.1001/jamasurg.2015.1325.

Farhan-Alanie et al. (2021): The effect of antibiotic-loaded bone cement on risk of revision following hip and knee arthroplasty. In: *The bone & joint journal* 103-B (1), S. 7–15. DOI: 10.1302/0301-620X.103B1.BJJ-2020-0391.R1.

Fernandez et al. (2022): Cemented or Uncemented Hemiarthroplasty for Intracapsular Hip Fracture. In: *The New England journal of medicine* 386 (6), S. 521–530. DOI: 10.1056/NEJMoa2108337.

Hailer et al. (2010): Uncemented and cemented primary total hip arthroplasty in the Swedish Hip Arthroplasty Register. In: *Acta orthopaedica* 81 (1), S. 34–41. DOI: 10.3109/17453671003685400.

Leong et al. (2020): Is the use of antibiotic-loaded bone cement associated with a lower risk of revision after primary total hip arthroplasty? In: *The bone & joint journal* 102-B (8), S. 997–1002. DOI: 10.1302/0301-620X.102B8.BJJ-2020-0120.R1.

Lindberg-Larsen et al. (2017): Increased risk of intraoperative and early postoperative periprosthetic femoral fracture with uncemented stems. In: *Acta orthopaedica* 88 (4), S. 390–394. DOI: 10.1080/17453674.2017.1302908.

Mäkelä et al. (2014): Failure rate of cemented and uncemented total hip replacements: register study of combined Nordic database of four nations. In: *BMJ (Clinical research ed.)* 348, f7592. DOI: 10.1136/bmj.f7592.

Rassir et al. (2021): What Are the Frequency, Related Mortality, and Factors Associated with Bone Cement Implantation Syndrome in Arthroplasty Surgery? In: *Clinical orthopaedics and related research* 479 (4), S. 755–763. DOI: 10.1097/CORR.0000000000001541.

Sanz-Ruiz et al. (2017): Is the Commercial Antibiotic-Loaded Bone Cement Useful in Prophylaxis and Cost Saving After Knee and Hip Joint Arthroplasty? The Transatlantic Paradox. In: *The Journal of arthroplasty* 32 (4), S. 1095–1099. DOI: 10.1016/j.arth.2016.11.012.

Stea et al. (2014): Multinational comprehensive evaluation of the fixation method used in hip replacement: interaction with age in context. In: *The Journal of bone and joint surgery. American volume* 96 Suppl 1 (Suppl 1), S. 42–51. DOI: 10.2106/JBJS.N.00463.

Tanzer et al. (2018): Is Cemented or Cementless Femoral Stem Fixation More Durable in Patients Older Than 75 Years of Age? A Comparison of the Best-performing Stems. In: *Clinical orthopaedics and related research* 476 (7), S. 1428–1437. DOI: 10.1097/01.blo.0000533621.57561.a4.

Troelsen et al. (2013): A review of current fixation use and registry outcomes in total hip arthroplasty: the uncemented paradox. In: *Clinical orthopaedics and related research* 471 (7), S. 2052–2059. DOI: 10.1007/s11999-013-2941-7.

Contact

trainings.medical@heraeus.com

www.heraeus-palacademy.com