Göteborg, 2018

Longitudinal outcomes following total hip replacement

Time trends, sequence of events and study of factors influencing implant survival and mortality

Akademisk avhandling

Som för avläggande av medicine doktorsexamen vid Sahlgrenska akademin, Göteborgs universitet kommer att offentligen försvaras i R-aulan, Sahlgrenska universitetssjukhuset, Mölndal, fredagen den 23 mars 2018, kl. 13.00

av

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Avhandlingen baseras på följande delarbeten

I. Cnudde P, Rolfson O, Nemes S, Kärrholm J, Rehnberg C, Rogmark C, Timperley J, Garellick G.
Linking Swedish health data registers to establish a research database and a shared decision-making tool in hip replacement
BMC Musculoskelet Disord. 2016 Oct 4;17(1):414.

II. Cnudde P, Nemes S, Bülow E, Timperley J, Malchau H, Kärrholm J, Garellick G, Rolfson O.
Trends in hip replacements between 1999 and 2012 in Sweden
J Orthop Res. 2017 Aug 28. [Epub ahead of print]

III. Cnudde P, Nemes S, Mohaddes M, Timperley J, Garellick G, Burström K, Rolfson O.
Is Preoperative Patient-Reported Health Status Associated with Mortality after Total Hip Replacement?
Int J Environ Res Public Health. 2017 Aug 10;14(8).

IV. Cnudde P, Rolfson O, Timperley J, Garland A, Kärrholm J, Garellick G, Nemes S.
Do Patients Live Longer After Total Hip Replacement Surgery and Is the Relative Survival Diagnosis-specific?
Accepted for publication in Clin Orthop Relat Res

V. Cnudde P, Nemes S, Bülow E, Timperley J, Whitehouse S, Kärrholm J, Rolfson O.
Risk of further surgery on the same or opposite site or mortality after primary total hip arthroplasty. A multi-state analysis of 133,654 patients from the Swedish Hip Arthroplasty Register.
In Manuscript

SAHLGRENSKA AKADEMIN
INSTITUTIONEN FÖR KLINISKA VETENSKAPER

GÖTEBORGS UNIVERSITET

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Time trends, sequence of events and study of factors influencing implant survival and mortality

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Abstract

Osteoarthritis of the hip is a common, debilitating and symptomatic joint disease. The disabling symptoms can be successfully treated with a total hip replacement (THR). It is known that the majority of patients do well following surgery, however some patients will need further surgery on the same or on the other hip or die prematurely in the perioperative period. The causes leading to further surgery for patients and the risks for mortality are multifactorial. The following are important factors in defining the risk for an individual patient: indication for surgery, complexity of operation, patient age, medical comorbidities, physical activity and socio-economic factors, types of implants used and surgical techniques employed, as well as perioperative protocols and post-operative treatment.

The research questions for this project were:

1. Has there been a change in patient-related, surgery-related and socioeconomic factors in patients undergoing elective hip replacements and have the various outcome parameters evolved?

2. Is there an association between self-reported health status and mortality following elective hip replacement?

3. Have patients who underwent THR a better relative survival than the general survival and is this influenced by the diagnosis for which the THR was undertaken?

4. What is the long-term risk of subsequent surgery on the same or the opposite hip and risk of mortality after an elective primary THR? Is there an influence of patient-related, surgery-related and socio-economic factors on subsequent surgery and dying?

Patient level data concerning many of these factors are available in the Swedish Hip Arthroplasty Register and administrative databases of the National Board of Health and Welfare and Statistics Sweden. This information was linked into a single research database. The principles of relative survival analysis and multi-state analysis with multivariable regression for statistical analysis were used. It was decided to study patients undergoing elective THR between 01/01/1999 and 31/12/2012.

Most patients were operated because of primary osteoarthritis and the proportion of patients with this indication increased further during the period of study at the expense of a decreasing number of patients with inflammatory arthritis.. The practice of elective THR has changed during the study-period, and there has been a reduction in 30- and 90-day mortality, an overall improvement of revision rates and patients have reported improved satisfaction and outcomes. Worse health status according to the EQ-5D before THR was associated with higher mortality up to five years after surgery. Patients with a THR had an improved relative survival compared to an age- and sex-matched population. A diagnosis-specific differentiation of relative survival rates post-THR favored patients with hip osteoarthritis. Higher Elixhauser comorbidity index, lower level of education and being widow or single had an adverse effect on survival.

The lifetime risk for bilateral surgery, revision and death was identified using the longitudinally collected data. Despite some changes in practice, the long-term outcome following THR has improved as surgical practices have evolved. A worse self-reported health status is associated with increased mortality in the medium-term. Overall, patients undergoing elective THR will have a better relative survival and a low risk of revision. The risk of receiving further surgery on the same or on the other hip is multifactorial and patients are twice as likely to have their other hip replaced than to die during the study-period. Performing a primary arthroplasty on the contralateral hip is 7 times more likely than a revision procedure on the first implanted hip.

Keywords: Total Hip Replacement, Outcome, Mortality, Revision, Register

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