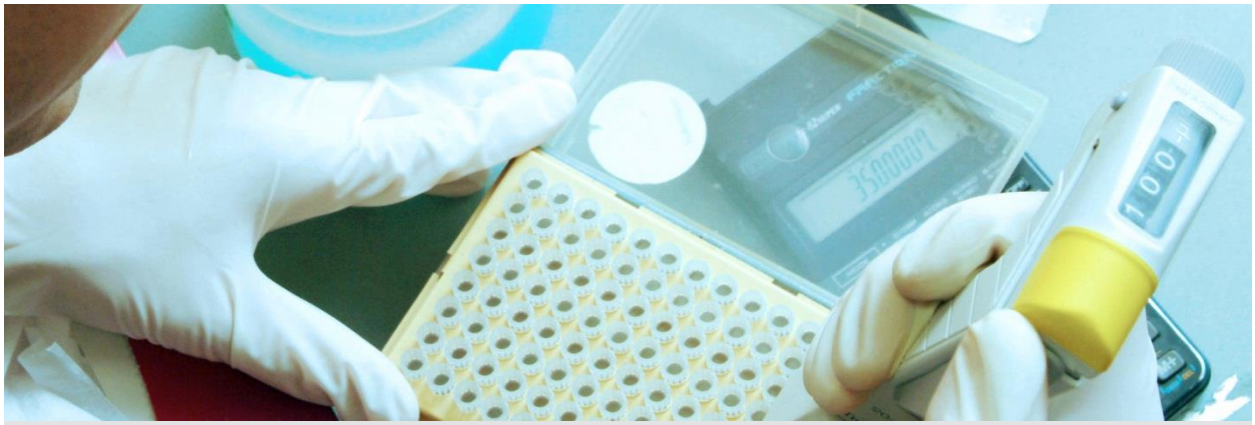
swiss medical board

Health Technology Assessment of knee arthroscopy for the treatment of degenerative changes



Summary

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Background

In the context of the Health Technology Assessment (HTA) program of the Swiss federation, services reimbursed by the compulsory health insurance are being re-evaluated. One of the topics selected in 2015 is arthroscopy of the knee, based on the Swiss Health Observatory (Obsan) report No. 42 "Variations géographiques dans les soins de santé. La situation en Suisse", which reported an increase of the rate of inpatient knee arthroscopies by 20% between 2005 and 2011. According to the report, the rates of inpatient arthroscopies differed markedly between cantons, i.e. cantons below the 10th percentile showed a standardized rate of 121 arthroscopies per 100'000 inhabitants, while cantons above the 90th percentile showed a standardized rate of 415.6 per 100'000 inhabitants. In addition, the proportion of inpatient and outpatient arthroscopies varied strongly from 16% up to 75% between cantons. These observations raise questions regarding the appropriate use and the benefit of knee arthroscopy.

Aim

This HTA report aims at assessing the clinical effectiveness and safety of

- therapeutic knee arthroscopy compared to any other treatment in patients with degenerative changes of the knee – irrespective of whether they are primarily due to meniscal damage, osteoarthritis of the knee or a mix of both;
- inpatient compared to outpatient therapeutic knee arthroscopy.

Also, this HTA report aims at assessing

- the cost-effectiveness of therapeutic knee arthroscopy compared to any other treatment in patients with degenerative changes of the knee – irrespective of whether they are primarily due to meniscal damage, osteoarthritis of the knee or a mix of both;
- the cost-effectiveness of inpatient compared to outpatient therapeutic knee arthroscopy;
- the budget impact of knee arthroscopy in patients with degenerative changes of the knee primarily due to meniscal damage.

Clinical effectiveness and safety

For this HTA report, clinical effectiveness and safety of knee arthroscopy in patients with symptomatic knee degeneration were addressed. Clinical effectiveness and safety of the setting (inpatient versus outpatient) in which therapeutic arthroscopy was performed were also studied. The literature search was conducted in July 2017 and filters for randomised controlled trials (RCTs) were used. The search was not restricted by time period or by language. RCT characteristics and results of the included RCTs were presented in tables and summarised descriptively. The main focus of the analysis was the results at short-term follow-up (≤6 months), intermediate follow-up (>6 months and <7 years) and long-term follow-up (longest follow-up time including and longer than seven years). Risk of bias was assessed according to the Cochrane Handbook, and the quality of evidence was assessed according to GRADE for short-term and intermediate follow-up. When possible, clinical outcome results were summarised quantitatively in a meta-analysis by using inverse variance models assuming random effects. Effect estimates (overall and for each RCT) with corresponding 95% confidence intervals (CIs) were presented as

forest plots. Relative risks (RRs) were calculated for binary outcomes. Continuous outcomes were presented as mean differences (MDs). If continuous outcomes were measured with different instrument (i.e. different scales) by the individual RCTs, the results of the individual RCTs were standardized, and the standardized mean differences (SMDs) were reported. In case of considerable heterogeneity, methodological and clinical factors that might explain the heterogeneity were explored in subgroup and sensitivity analyses where possible. Pre-specified subgroup/sensitivity analyses addressed

- patients with symptoms mainly due to meniscal degeneration (degenerative meniscus of the knee, DMK) versus patients with symptoms mainly due to osteoarthritis (OA) of the knee versus mixed populations with concurrent DMK and OA;
- RCTs in which a non-active comparator was used versus those RCTs in which an active comparator was used.

There were 21 RCTs (including more than 2,000 patients) identified for the assessment of clinical effectiveness and safety of arthroscopy in patients with degenerative knee symptoms. Data were extracted for short-term follow-up and intermediate follow-up, for the outcomes of pain, function, global assessment (combined pain, function and/or stiffness), joint stiffness, occurrence of total knee replacement, quality of life, adverse events and serious adverse event. There were no statistically significant differences between arthroscopy and comparator found for the outcomes of function, global assessment, joint stiffness, total knee replacement and quality of life at short-term (≤6 months) or intermediate follow-up (>6 months and <7 years). There was a small statistically significant effect in favour of arthroscopy in the outcome of pain at short-term follow-up (SMD -0.16, 95% CI [-0.31, -0.01]), while no statistically significant difference was found at intermediate follow-up. None of the included RCTs reported outcomes at long-term follow-up. There was limited evidence of harms reported by the RCTs; therefore, it was difficult to assess the overall clinical effectiveness with regards to benefits and harms of arthroscopy.

The overall quality of evidence was judged to be very low at short-term follow-up because of the very low quality of evidence for the critical outcome of function. The overall quality of evidence was judged to be low at intermediate follow-up because of the low quality of evidence for the critical outcomes of pain, function and global assessment.

One RCT (100 patients) was identified for the assessment of the clinical effectiveness and safety of arthroscopy in the inpatient and outpatient settings. This RCT reported only on pain within a week of discharge and found no difference. The overall quality of evidence was judged to be very low.

Cost-effectiveness and budget impact

To gain understanding of the cost-effectiveness of therapeutic knee arthroscopy compared to any other treatment in patients with degenerative changes of the knee, the available published literature was analysed. The analysis was based on a literature search using the same search terms as in the clinical effectiveness and safety section of this report, in combination with economic terms. After screening of the search results to identify eligible studies, extraction of relevant information, assessment of quality of reporting according to the CHEERS checklist, and assessment of transferability to Switzerland (for international studies) were performed. For the

studies judged to be qualitatively transferable, cost estimates were adapted to Switzerland and cost-effectiveness results re-calculated.

Four cost-effectiveness studies were identified. Two compared knee arthroscopy to non-operative treatment and showed discordant results: one suggested that knee arthroscopy was more expensive and less effective than non-operative interventions alone from both the societal and healthcare payer perspective; the other suggested that knee arthroscopy was more costly and more effective (incremental cost-effectiveness ratio [ICER] better than CHF 30,000 per quality adjusted life year [QALY] gained) from a healthcare payer perspective or even cost-saving from a societal perspective, if compared to physical therapy alone. To understand the reasons behind this discrepancy, both publications as well as the sources used in their calculations were analysed in detail. In both cases, relevant methodological flaws were found. Two other studies comparing preoperative status with postoperative status suggested that knee arthroscopy may be cost-effective with ICERs of CHF 7,200 to 7,300 per QALY gained. However, pre-post clinical studies do not represent a reliable basis for deciding whether an intervention is cost-effective or not. Given the very limited health economic evidence, it is difficult to draw firm conclusions on the cost-effectiveness of arthroscopic surgery in patients with degenerative changes of the knee. Although three of four available studies reported arthroscopy to be cost-effective, this cannot be regarded as convincing.

The budget impact analysis focused on the costs of knee arthroscopy in patients with degenerative changes of the knee primarily due to meniscal damage, from a health insurance system perspective in Switzerland. Two steps were performed: first, the annual frequency of knee arthroscopies in Switzerland was investigated; second, based on the annual frequency, the total annual costs were estimated. The frequency in the inpatient setting was investigated using diagnosis-related (DRG) codes, ICD-10 codes, and Swiss classification of surgical interventions (CHOP) codes provided in the Swiss Hospital Statistics for the years 2010 to 2014. Two analytical strategies were used: in the first, only patients who reported at the same time a relevant DRG code, at least one relevant diagnosis (ICD-10 code), and at least one relevant treatment (CHOP code) were included. In the second strategy, all patients who had at the same time at least one relevant diagnosis (ICD-10 code) and one relevant treatment (CHOP code), irrespective of the reported DRG codes, were included. To assess the frequency of arthroscopies in the outpatient setting, an analysis of medical tariff (TARMED) codes in 2013 and 2014 provided by the Swiss Federal Office of Public Health was used. The unit costs for the budget impact calculation were based on data from the diagnosis-related case costs statistics provided by the Swiss Federal Office of Statistics ("Statistik diagnosebezogener Fallkosten") and on published estimates.

The results of the budget impact analysis suggested that the total expenditure for knee/meniscus derangement in Switzerland ranged from CHF 53.52 Mio. to CHF 71.93 Mio. in 2013 and from CHF 52.30 Mio. to CHF 67.73 Mio. in 2014. Outpatient costs accounted for 20-28% of the total costs. The results of the analysis according to our second patient selection strategy, based on ICD-10 codes and CHOP codes, are considered more realistic than those according to the first strategy also considering DRG codes. This second strategy suggested total inpatient costs of CHF 58.10 Mio. in 2010, CHF 55.87 Mio. in 2011, CHF 58.44 Mio. in 2012, CHF 57.20 Mio. in 2013 and CHF 54.47 Mio. in 2014. Total outpatient costs were estimated to be CHF 14.73 Mio. in 2013 and CHF 13.26 Mio. in 2014. The results of the budget impact analysis according to the first patient selection strategy seemed to be quite uncertain due to the changes (from All Patients Diagnosis-Related Group [APDRG] until 2011 to Swiss DRG from 2012 onwards) and inconsistencies in the DRG coding system.

The results of the budget impact analysis are in line with those results reported in a very recent publication of the Swiss Health Observatory (Obsan). Assuming approximately 14,000 meniscectomies per year and inpatient costs of CHF 4,889 per case, the authors of the Obsan report estimated total inpatient costs of CHF 55.6 Mio. in 2016.

Conclusion

In conclusion, there is no evidence that knee arthroscopic interventions in patients with degenerative changes of the knee have any benefit on outcomes measured at short or intermediate follow-up, with the exception of a small effect on the reduction of pain at short follow-up. Therefore, it remains unclear whether knee arthroscopy has an effect on the assessed outcomes. Long-term follow-up data are not available. Reporting on harm was scarce and no conclusions can be drawn regarding the benefit-harm balance. The overall quality of evidence at short and intermediate follow-up was judged to be very low and low, respectively. In addition, there is no evidence that the subgroup of patients with solely DMK has a benefit from arthroscopic treatment. The clinical effectiveness findings of this assessment may be generalizable to a broader population experiencing knee pain due to a degenerative knee disorder. The findings are consistent with recently published systematic reviews.

Given very limited health economic evidence, it is difficult to draw firm conclusions on the cost-effectiveness of arthroscopic surgery in patients with degenerative changes of the knee. Although three of four available studies reported arthroscopy to be cost-effective, this cannot be regarded as convincing, given the methodological issues described and also in light of the results of the assessment of effectiveness.