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Time to remove our rose-tinted spectacles: a candid appraisal of the relative success of surgery in over 4500 patients with degenerative disorders of the lumbar spine, hip or knee.

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ABSTRACT

PURPOSE

Studies comparing the outcome of spine surgery with that of large-joint replacement report equivocal findings. The patient-reported outcome measures (PROMs) used in such studies are typically generic and may not be sufficiently sensitive to the successes/failures of treatment. This study compared different indices of «success» in patients undergoing surgery for degenerative disorders of the lumbar spine, hip, or knee, using a validated, multidimensional, and joint-specific PROM.

METHODS

Preoperatively and 12 months postoperatively, 4594 patients (3937 lumbar spine, 368 hip, 269 knee) undergoing first-time surgery completed a PROM that included the Core Outcome Measures Index (COMI) for the affected joint. The latter comprises a set of single items on pain, function, symptom-specific well-being, quality of life, and disability-all in relation to the specified joint problem. Other single-item ratings of treatment success were made 12 months postoperatively.

RESULTS

In multiple regression analyses, controlling for confounders, the mean improvement in COMI at 12 months was greatest for the hip patients and lowest for those with degenerative spinal deformity (= the statistical reference group) ($p < 0.05$).

Compared with spinal deformity, the odds of achieving «success» were: higher for hip (OR 4.6; 95 % CI 2.5-8.5) and knee (OR 4.0; 95 % CI 2.1-7.7) (no difference between spine subgroups) for «satisfaction with care»; higher for hip (OR 16.9; 95 % CI 7.3-39.6), knee (OR 6.3; 95 % CI 3.4-11.6), degenerative spondylolisthesis (OR 1.6; 95 % CI 1.2-2.2), and herniated disc (OR 1.7; 95 % CI 1.2-2.4) for «global treatment outcome»; and higher for hip (OR 13.8; 95 % CI 8.8-21.6), knee (OR 5.3; 95 % CI 3.6-7.8), degenerative spondylolisthesis (OR 1.6; 95 % CI 1.3-2.1), and herniated disc (1.5; 95 % CI 1.1-2.0) for «patient-acceptable symptom state».

Patient-rated complications were the greatest in degenerative spinal deformity (29 %) and the lowest in hip (18 %).

CONCLUSIONS

The current study is the largest of its kind and the first to use a common, but joint-specific instrument to report patient-reported outcomes after surgery for degenerative disorders of the spine, hip, or knee.

The findings provide a sobering account of the significantly poorer outcomes after spine surgery compared with large-joint replacement. Further work is required to hone the indications and patient selection criteria for spine surgery.

HOW SHOULD WE INTERPRET THESE RESULTS?

Proportion of patients perceiving a successful surgery according to different criteria

Groups	Satisfaction	GTO	MCIC	PASS
Lumbar Degenerative Deformity	84 %	75 %	67 %	44 %
Lumbar Spinal Stenosis	83 %	73 %	67 %	48 %**
Lumbar Degenerative Segment	88 %	81 %	74 %	53 %
Lumbar Degenerative Spondylolisthesis	88 %	83 %	73 %	56 %
Lumbar Herniated Disc	90 %	84 %	79 %	55 %
Knee	96 %	95 %	90 %	81 %**
Hip	96 %	98 %**	93 %**	93 %**
Study Group Average	88 %	81 %	75 %	57 %

**p < 0.001 indicate larger or lower counts than expected

- GTO – Global Treatment Outcome
- MCIC – Minimal Clinically Important Change
- PASS – Patient-Acceptable Symptom State

KEY POINTS

The aim of the present study was to compare the outcomes after surgery in a large number of patients with different degenerative disorders of the lumbar spine, hip, or knee, using a brief patient-reported outcome measure (PROM) that includes the «Core Outcome Measures Index» (COMI).

Analyses suggest that patients of the 2020s will be more demanding of treatment and less willing to live with their symptoms than our current elderly[2].

Spine and the large joints of the lower extremity disorders impact the same «core domains» of importance to the patient (pain, function, quality of life, etc.), which allows them to be compared, given an appropriate set of questions that tap these domains.

> It is well known that the proportion of patients that can be considered a success after treatment depends very much on how success is defined, in terms of both the specific metric employed and the cut-off values applied[16, 17].

Recent studies suggest that the patient's achievement (or not) of an «acceptable symptom state» (PASS) may offer a more rigorous measure of success and better tease out differences between treatments[19]. Furthermore, enquiry as to the patient's perspective on complications arising after surgery may provide a hitherto poorly investigated, but extremely important aspect of patient outcome[20].

RESULTS

Using a very brief, multidimensional instrument to cover all the core domains of importance to patients – including some novel and sensitive indices that are not included in existing joint-specific or generic instruments – the study showed that the extent to which THR proved superior to TKR and spine surgery was highly sensitive to the method used to categorize success.

THR is considered to be one of the most successful orthopedic procedures available today[5], and the results of our study also substantiated this.

It was in top place for all indices, including satisfaction with care, improvement, current state, patient-rated complications, and repeat surgery.

However, the extent to which it distinguished itself from the other treatments clearly depended on the precise metric used. Scores on «satisfaction with care» showed the least difference among the groups.

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The odds of being satisfied were the same for hip and knee patients and were approximately fourfold those for the spine patients; however, all groups showed respectable figures, with greater than 83 % patients being satisfied.

Satisfaction with care, which is influenced by the patient–provider relationship and concerns treatment delivery, typically yields higher proportions of success than constructs focused on therapeutic improvement[23].

The effectiveness of a procedure can be measured as either «the extent of improvement» (doing better) or the «actual state» (doing well) following treatment. The study's indices of improvement teased apart further differences between the groups, with > 95 % of hip and knee patients reporting a good global treatment outcome, compared with 73 – 84 % spine patients.

Of all the indices, the PASS was the index that revealed the lowest rates of success for all pathologies and the greatest differences between the pathologies, with only about half of the patients in the spine group achieving an acceptable symptom state, compared with 81 % of the knee and 93 % of the hip patients.

This highlights the fact that even large and statistically significant improvements in outcome scores do not necessarily mean that an acceptable state is reached in the end. This is perhaps our most poignant take-home message.

The success of surgery seemed to diminish in line with the increasing complexity of the «motion segment» (hip, knee, spine). Multisegmental spine pathology (present in 50 % of our spine patients) might serve to increase the complexity again, as might previous surgery at a different spinal level (12 % patients). Problems with the hip and knee are often unilateral and may be relieved by resting the joint, whereas disorders of the centrally located spine may result in limitations that are more difficult to cope with.

In spine, it is generally the case that the greater the concordance between symptoms, multimodal imaging (X-ray, MRI), and the rationale for the planned procedure, the better is the outcome. There are clear subsets of spine patients that benefit more from a given surgery – e.g., herniated disc patients with greater leg pain than back pain undergoing decompression[34] and discogenic pain patients with a distinct pain pattern undergoing fusion[35].

It may well be argued that current spinal surgery reflects where PASS outcomes for THR and TKR were in the 90's.

In summary, there are numerous reasons why outcomes are, and can be expected to be, significantly worse for spine surgery than for THR or TKR. However, if this is not exposed by the use of sensitive and stringent measures, and we instead elect to believe the generic quality of life data that suggest comparable or even superior results for spine surgery[4, 5, 8], then we will fail to seek and attract the necessary investment in research to improve the situation.

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