Painful hip arthroplasty: definition

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Summary

Total hip arthroplasty (THA) has been indicated as the surgical intervention with greatest improvement in pain and physical function. However some patients continue to experience hip pain after elective surgery. We investigate prognostic factors that negatively affect treatment effectiveness and the patient outcome. The “hip region” constitutes the groin, buttock, upper lateral thigh, greater trochanteric area, and the iliac crest. Pain originating from various sources and not directly linked to prosthesis may be perceived here and includes the lumbosacral spine, referred pain from abdominal organs and soft tissue sources such as trochanteric bursitis, tendinitis, hip abductor dysfunction, and inguinal hernia. An accurate assessment of the pain cause is extremely difficult to construct and a complete differential diagnosis is fundamental. We assess all the possible causes of hip pain after THA and we divide them depending on the presence or absence of radiographic signs.

KEY WORDS: total hip arthroplasty; pain; epidemiology; complication; revision.

Introduction

Total hip arthroplasty (THA) is one of the most clinically successful and cost-effective interventions in health care, with excellent long-term results in terms of reducing pain and improving function and quality of life in patients with debilitating hip disease (1-3).

Self-reported patient satisfaction has been reported to be closer to 90% (4). Many authors reported on successfully relieved pain after THA also in cases where patients’ preoperative functional status was poor (5,6). Physical function improvement is long lasting over 25 years (7) and is not affected by mild pain (8). However, despite remarkable developments in surgical technique and implant design, some patients continue to experience distressing pain after elective surgery. Results from a Danish nationwide study found that 12.1% of patients 12-18 months after hip arthroplasty were significantly impaired in their daily activities by chronic pain (9). The occurrence of pain following a technically satisfactory arthroplasty is of concern for both the orthopaedic surgeon and the patient. It’s one of the most difficult challenges for the surgeon to evaluate and to treat. The difficulties in managing painful THA is due to the heterogeneous nature of the disease. Pain related to the surgery itself can be associated with the implant, bone alterations and soft tissue or nerve injuries. The situation complicates when history, clinical examination, and plain radiography fail to locate the exact origin of hip pain. In few cases patients were revised without having found the cause of pain. In the total 299,368 primary THAs reported in the Swedish Hip Register that were performed from 1979 to 2008, the 0,03% was revised for pain as a single cause representing the 0,4% of all the reasons for revision in the 24,199 first revision THAs (10).

In order that the source of the pain to be accurately located, a systematic approach is required. Surgeons and physicians must contend with numerous factors that can affect the patient outcomes. We have analyzed the predisposing factors that could lead to a painful hip arthroplasty and we have investigated the possible causes of this pain.

Painful HIP predisposing factors

Prognostic factors influence the probability of response, remission, recurrence and duration of pain after the operation. Determining prognostic factors that affect treatment effectiveness is essential to clinicians and important to patients in their decision-making. Many factors can affect the patient outcome, like patients’ preoperative status and characteristics, timing of operation, type of operation, type of prosthesis and length of hospital stay but only few of these seems to have a correlation with pain (11,12).

Age and pain. Some studies that examined age as potential predictors of pain reported more pain in younger patients (13). Better pain outcomes in the more elderly compared to younger patients may be due to higher pain tolerance, lower physical demands for sports-related activities and lower prevalence of subclinical anxiety and depression. When results were adjusted for covariates of interest and potential confounders, including gender, BMI, comorbidity, ASA class, operative diagnosis, depression, and anxiety, age of the patient seems to be more important for the improvement in physical function than for the improvement in the pain score (11). Clarke et al. confirmed in a prospective double blind randomized study that age do not influence the outcome of pain (14). McGuigan et al. (15) and Nilsson et al. (16) found that older patients had a degree of pain improvement similar to that experienced by those younger. The postoperative functional limitation in more elderly is likely related to greater severity of other comorbidity (back problems, vision, and balance problems) and higher risk of arthritis in other lower extremity joints. The preoperative subjective status is the only significant predictor of the six months self-perceived functional status. In other words, the worst pre-operative self-perceived status was also the worst post-operative self-perceived status will be (17).

Gender and pain. The relationship between gender and pain is not clear. Some studies reported that women experienced less post-operative pain than men (18). Bogoch et al. (19) found that women had more pain than men, both preoperatively and postoperative-
and postoperative pain (18, 32, 33). no association between the time that the patients waited for surgery
in this study. Conversely, lower body mass index (BMI: 35-40) was associated with significant-
postoperatively (24). Similarly Bolland et al., in 28,068 THAs found
weight (BMI 25 kg/m^2, n 11), overweight (BMI 25 to 29.9 kg/m^2,
found that no significant differences in postoperative functional sta-
tus was poor, they were more likely to have pain and need as-
Patients’ expectation. Mahomed et al. (30) explored the role of pa-
Heterotopic ossification: is the abnormal formation of lamellar bone in nonosseous soft tissues. Even if the radiographic preva-
level of education. Patients with a higher level of education reported
greater improvement in the pain score (28). MacWilliam et al. (26) found that a low
level of education, and each additional comorbidity were asso-
ciated with a decrease in the change in the pain score (p < 0.01)
and the change in the physical function score (p < 0.01).

Negative X-rays

1. Reactive synovitis: MRI has been proposed to assess reactive
synovitis and osteolysis due to particle debris. Osteolysis can be
detected before it comes evident on x-ray. Cooper et al. (45)
studied with MRI a group of young patients (43-65 years) three
years after surgery. They found reactive synovitis in 39%,
no signs of osteolysis and no correlation with synovitis and pain.
2. Aseptic lymphocytic vasculitic associated lesion (ALVAL): is a
localized hypersensitivity reaction and immunologic response to
metal wear debris (46). It may present as groin pain, or effusions
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or soft tissue masses, even with night sweats (47). Metal-on-metal THAs may present with pain due to hypersensitivity 1 to 3 years following arthroplasty (48).

3. Prosthesis impingement: Nasser et al. (49) reported that 21 of 116 (18%) of the patients undergone hip resurfacing referred persistent groin pain due to insufficient head/neck offset, an uncovered acetabular component, or both. Possible explanations are repetitive contact on the capsulare or friction over the iliopectineal bursa. Also Bartelt et al. confirmed higher groin pain due to impingement in resurfacing arthroplasty than conventional THA.

4. Iliopsoas tendinitis: Pain characteristics: activity related pain, pain that begins when starting to walk after sitting, the localization is to the groin or to the buttck. Malposition of the acetabular component may be associated with psoas tendon impingement that becomes symptomatic with active flexion of the hip (51, 52). The incidence of iliopsoas tendinitis in conventional THA's ranges between 0.3% and 4.3% (49).

5. Abductor muscle damage: Muller et al. (53) investigated with MRI patient one year post surgery. They found muscle minus damages in 50% of patient but they didn't found any correlation with pain. Similar results are reported by Pfitzmann et al. (54). Instead muscle medius tendon rupture after total hip arthroplasty presented clinically with lateral pain, limp, and a positive Trendelenburg test secondary to severe abductor weakness (55).

6. Trochanteric bursitis: Pain characteristics: pain over the great trochanter persistent for several months, described as neuropathic burning with dysesthesia and allodynia (56). Sometimes there is a correlation with radiographs signs of trochanteric periosteal remodeling or ossification.

7. Lumbar spine disease: Patients with severe hip osteoarthritis often complain low back pain (LBP) due to abnormal spinal sagittal alignment and wobbling gait configuring the hip spine syndrome. Hip arthritis and lumbar spine arthritis coexist in 10% to 15% of patients and often present with similar signs and symptoms (57). At 24 months follow-up after THA these patient referred a further improvement in hip function corresponded with continued improvement of spinal function and reduced LBP (58). Some patients may find an initial worsening in the symptoms after successful THA because of increased activity levels. Pain characteristics: pain that begins when starting to walk after sitting. Severe osteoarthritis, spinal stenosis, lumbar degenerative disk or disc herniation present with different pain pattern in relation to the anatomic involvement, but all of them may present as referred hip pain and must be investigated during clinical examination.

8. Nerve injuries: Neurologic complications following THA are usually noted immediately after surgery, but delayed onset is possible even when due to intraoperative events. Nerve injury can manifest days after surgery as a result of direct pressure or formation of a hematoma. Farrel et al. (59) reported a clinically evident nerve injury incidence of 0.6-1.3%. The most compromised is the sciatic followed by the femoral, the obturator and the superior gluteal nerves. Brown et al. (60) reviewed the literature finding an incidence of 0.09%-3.7% and no association with single risk factor.

9. Hernia femoral, inguinal, obturator: may present with groin pain. In this case differential diagnosis is simple, an ecotography may be helpful (35, 39).

10. Referred pain. Affections to internal organs may refer pain to the hip region. Pain history and pattern must be taken in account to assess its true origin (38).

Conclusion

The aim of THA surgery is a satisfied patient with optimal pain relief and satisfaction and an essentially normalized health-related quality of life. Despite the optimal results some patient may face with new or persistent pain after surgery (9). Despite a better understanding of the pathophysiology of pain in some cases is impossible to understand the causes of persistent pain. We reviewed prognostic factors of pain finding that age (11, 14, 17) and waiting time for surgery (18, 32, 33) is not significantly associated with hip pain. While poor pre-operative scores (11, 26-28), low level of education (25, 26), expectation of increase in nonessential activity with the operation (31) are all predictive of post-operative pain. Depression and poor mental status have a positive association with pain at 2 years follow-up (17, 34). Gender is weakly correlated with post-operative pain as some studies reported more pain in woman (15, 16, 19), while a large cohort study referred more pain in men (10). BMI seems not to influence postoperative pain only at early follow-up (23-25) while at 5 years more heavy patient (BMI > 35) complain more pain. The widely variable nature of painful prostheses makes it extremely difficult to construct criteria for assessment. Careful history taking, physical examination, and plain radiographs are believed to provide crucial information. Surgeon must keep in mind all the causes of hip pain to make a correct differential diagnosis.

Many studies examined patient characteristics as potential predictors of pain and function outcomes (11, 12), but were limited to small samples of patients (<300 cases) (15, 18, 23, 24) and reported contradictory results (13, 15-18). The small sample size makes them underpowered to detect significant associations, thereby leading to false negative results. Additional research into pain characteristics needs to shift from retrospective cohort studies to longer-term large prospective investigations.

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