Systematic Review

Randomized Controlled Trials for Arthroscopy in Degenerative Knee Disease: Was Conservative Therapy Appropriately Tried Prior to Arthroscopy?

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Purpose: We aimed to determine if the randomized controlled trials (RCTs) evaluated in the most recent meta-analysis on arthroscopic surgery for degenerative knee arthritis included documented trials of appropriate conservative treatment prior to randomization. **Methods:** We selected all RCTs of the most recent meta-analysis by Brignardello-Petersen and recorded for each RCT, if physiotherapy prior to randomization was mandatory. We compared the treatment effect of arthroscopy in studies in which physiotherapy prior to randomization was mandatory versus studies in which it was not. This review was registered in the PROSPERO database (CRD42017070091). **Results:** Of the 13 RCTs in the meta-analysis, there were 2 in which physiotherapy prior to randomization was mandatory. In 1 additional multicenter RCT, prior conservative treatment was mentioned as mandatory in the publication, but not in the protocol. The treatment effects attributed to arthroscopy in terms of short-term pain ($P = .0037$), short-term function ($P = .0309$), and long-term function ($P = .0012$) were larger in studies in which prior physiotherapy was mandatory. **Conclusions:** Although the most recent meta-analysis claims that it is based "on patients who do not respond to conservative treatment," physiotherapy was mandatory prior to randomization only in 2 of the 13 studies. As several orthopaedic guidelines recommend that the first line of treatment in patients with degenerative arthritis of the knee should be conservative, for instance with physiotherapy, and the question of performing arthroscopy arises once conservative treatment fails, 11 of the 13 RCTs failed to adhere to these accepted guidelines. Therefore, patient selection in these 11 studies may not represent the typical indications for arthroscopy, where patients have tried conservative management prior to being offered surgery. When comparing studies where prior physiotherapy was mandatory to studies in which it was not mandatory, there were statistically significant effects favoring arthroscopy in terms of pain in the short term, and for function both in the short and the long term. These findings suggest that the treatment effects attributed to arthroscopy were higher when prior physiotherapy was mandatory. Given these findings, the external validity of most of these RCTs, and the resulting "strong recommendation against the use of arthroscopy in nearly all patients with degenerative knee disease," is called into question. **Level of Evidence:** Level II, systematic review of Level I and II studies.

Although arthroscopy of the knee is one of the most frequent surgical procedures in orthopaedic surgery, several randomized controlled trials (RCTs) have questioned the value of this procedure. This led to a recent publication of a "rapid recommendation" in a general medical journal, in which a "strong recommendation against the use of arthroscopy in nearly all patients with degenerative knee disease"[1] was issued.

That "rapid recommendation" is based on a recent meta-analysis by Brignardello-Petersen[2] in which the authors wrote that patients were included "with symptomatic degenerative knee disease (defined as persistent knee pain that affects the patient's quality of life and does not respond to conservative treatment), with or without osteoarthritis, of any age."[2]

However, when looking at the RCTs assessed in that meta-analysis, we got the impression that most of these RCTs were performed in patients who had *no* prior conservative treatment before they were randomized to arthroscopy versus some kind of conservative

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The authors report that they have no conflicts of interest in the authorship and publication of this article. Full ICMJE author disclosure forms are available for this article online, as supplementary material.

Received August 8, 2017; accepted December 9, 2017.

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0749-8063/17927/$36.00

https://doi.org/10.1016/j.arthro.2017.12.016

treatment. Randomization at such an early disease stage is not in accordance with typical orthopaedic practice, where a conservative approach with physiotherapy is tried as the first line of treatment, as recommended by several orthopaedic guidelines, authored by the American Academy of Orthopaedic Surgeons (AAOS),[3] the National Institute for Health and Care Excellence (NICE),[4] the Osteoarthritis Research International (OARSI),[5] and the European Society of Sports Traumatology, Knee Surgery, Arthroscopy (ESSKA).[6] According to these guidelines, arthroscopy is only considered once conservative therapy has failed to provide adequate pain relief.

For that reason we aimed to determine if the randomized controlled trials (RCTs) evaluated in that most recent meta-analysis on arthroscopic surgery for degenerative knee arthritis included documented trials of appropriate conservative treatment prior to randomization. Given the statement by Brignardello-Petersen[2] that the studies of that meta-analysis included patients who did "not respond to conservative treatment," we hypothesized that prior physiotherapy was mandatory in all of these studies.

Methods

This is an *additional* review of the publications analyzed in a recent meta-analysis[2] of RCTs investigating the use of arthroscopy as a treatment of degenerative arthritis of the knee. We have chosen the meta-analysis by Brignardello-Petersen,[2] because it is the most recent meta-analysis and it triggered the "rapid recommendation" practice guideline[1] of a high-impact medical journal.

We obtained the full-text publications of all the RCTs of that meta-analysis[2] and recorded the inclusion and exclusion criteria of the patients, with a special emphasis on whether the subjects enrolled had completed a trial of prior physiotherapy. The extraction of these data was performed by the lead author (TRL), and the data are summarized in Appendix Table S1(available at www.arthroscopyjournal.org). If the publication did not give sufficient information on this topic, it was attempted to analyze the study protocol and/or the study registration. The number of studies in which physiotherapy prior to randomization was mandatory was identified.

Using the treatment effects (TE) and the standard error of the treatment effects (seTE) published in the appendix of the meta-analysis of Brignardello-Petersen,[2] we compared the short- and long-term outcomes pain and function in trials in which physiotherapy was mandatory prior to randomization versus trials in which it was not. In accordance with Brignardello-Petersen,[2] we tested for these subgroup differences of the random effects model using the Hartung-Knapp-Sidik-Jonkman method.

For all data analyses we used the R package "meta," version 4.8-4.[7] This review was registered in the PROSPERO database (CRD42017070091).

Results

There were 13 studies[8-21] included in the meta-analysis, all meeting the criteria to be considered an RCT. Of these, it was mentioned in 2 studies[10,19] that patients had undergone physiotherapy prior to randomization.

In one study it was unclear if the patients received physiotherapy prior to randomization, because the authors wrote, "We enrolled patients … who had knee pain (for >3 months) that was unresponsive to conventional conservative treatment."[12] As we were unable to assess if "conventional conservative management" included physiotherapy, we searched the study protocol that is available on the website of the respective journal, where it reads: "Inclusion criteria: … A pain located on the medial joint line of the knee that has persistent at least for 3 months." Identical information could be found in the study registration. Neither in the protocol nor in the study registration could we find a passage similar to "unresponsive to conventional conservative treatment," although it was mentioned in the publication. Therefore, we considered it unlikely that this criterion was actually used for patient selection.

When comparing the treatment effect of arthroscopy in the 2 studies in which prior physiotherapy was mandatory (i.e., Gauffin et al[10] and Chang et al[19]) to the overall random treatment effect of the remaining studies, there were statistically significant effects favoring arthroscopy in studies where prior physiotherapy was mandatory regarding pain in the short term ($P = .0037$), and for function both in the short ($P = .0309$) and the long term ($P = .0012$). Therefore, the effects attributed to arthroscopy were larger when prior physiotherapy was mandatory (Figs 1-4).

Discussion

In our additional analysis of the studies used for the meta-analysis by Brignardello-Petersen[2] regarding arthroscopy of the knee, we found that physiotherapy was mandatory prior to randomization only in 2 of the 13 included studies. This suggests that the current "rapid recommendation"[1] that derives its results from that meta-analysis is mainly based on RCTs in which patients had *not* undergone documented conservative treatment prior to randomization. This finding is surprising, especially because the authors stated that their meta-analysis was based on "patients with symptomatic degenerative knee disease (defined as persistent knee pain that affects the patient's quality of life *and does not respond to conservative treatment*)." Omitting physiotherapy in patients with symptomatic degenerative