Trochanteric Pain in Patients Undergoing Total Hip Arthroplasty: A Protocol for a Systematic Review

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ABSTRACT

Background: Total hip arthroplasty (THA) is one of the most common surgical procedures. Although THA surgeries are typically very successful, between 3% and 17% of all patients experience trochanteric pain after surgery. Unfortunately, there remains little high quality and reproducible evidence surrounding this disorder, especially following total hip replacement. The objectives of this review are to describe, among pre-operative or post-operative primary THA patients the prevalence, treatments, prognosis, risk factors, and diagnostic methods available for trochanteric pain.

Methods: This is a protocol for a descriptive systematic review of trochanteric pain among THA patients. We will include studies of all study designs, with the exception of non-systematic reviews and expert opinion, with no date limits. We will search Medline, Embase, CINAHL, and the Cochrane Library using the Ovid search interface. We will also search the reference lists of included studies for possible missed studies. We will use the systematic review management software Rayyan to assist with study screening. Two reviewers will independently review studies for inclusion and extract data into a study-specific database.

Discussion: This study will add to the literature by comprehensively and systematically evaluating the available literature on trochanteric pain after THA. Previous studies have been conducted on the topic but they were not comprehensive or did not review the literature systematically. Additionally, our study will critically evaluate the methodological quality of the included studies, adding an evidence-based component to the review. This review will help orthopaedic surgeons better care for patients with trochanteric pain after THA, and will identify knowledge gaps for future research.

Registration: This protocol will be registered on PROSPERO

INTRODUCTION

Background

Total hip arthroplasty (THA) is one of the most common surgical procedures. In Canada, 51,000 hip replacement surgeries and 4,300 revision hip replacement surgeries were performed in 2014-2015[1]. This number represents a 20% increase compared to 5 years prior[1]. Although THA surgeries are typically very successful, between 3% and 17% of all patients experience trochanteric pain after surgery[2].

Trochanteric pain is described as laterally based hip pain, near or around the greater trochanter, which is reproducible with palpation. Possible causes of trochanteric pain include altered biomechanics (including increased offset following THA) and leg length discrepancies, bursal inflammation and muscular pain secondary to surgical approach and exposure. The reported risk factors for development of post THA trochanteric pain include surgical approach used, patient co-morbidity status, smoking history and patient sex[3,4]. Disability from trochanteric pain can be severe requiring analgesia, other non-surgical treatment, or even surgical treatment for the more severe cases[5]. Relapse rate of trochanteric pain following initial successful response to injected corticosteroid approaches 25% at 10 months[4.] Surgical interventions are available, but these are costly, and carry risks including infection or revision of prosthetic implants.

Often the management of trochanteric pain will include non-operative modalities such as targeted physiotherapy, and then progressing to superficial injections into the trochanteric bursa if symptoms are unresponsive to treatment[5].

Unfortunately, there remains little high quality and reproducible evidence surrounding this disorder, especially following total hip replacement. Clinicians struggle to counsel their patient on even the basic aspects of this very common problem. The incidence, evidence based treatments, and even general outcomes are poorly reported in the literature. For that purpose, the following objectives for this research study have been selected:

Objectives

The objectives of this review are to describe, among pre-operative or post-operative primary THA patients:

1. The prevalence of trochanteric pain.
2. The available treatments for trochanteric pain.
3. Clinical outcomes after trochanteric pain (prognosis).
4. The risk factors for trochanteric pain.
5. The methods available for diagnosing trochanteric pain.

METHODS

Overview

This is a protocol for a descriptive systematic review of trochanteric pain among THA patients. This systematic review will be registered with PROSPERO [registration number to be added once registered]. This protocol follows PRISMA-P[6] guidelines for reporting systematic review protocols. The systematic review will follow PRISMA[7] reporting guidelines. All important amendments to the protocol (i.e. not administrative in nature) will be formally documented with a protocol amendment.

Eligibility Criteria

We will include studies of all study designs, with the exception of non-systematic reviews and expert opinion. We will not set date limits. We will attempt to include studies in languages other than English, provided that we can locate a suitable translator to assist with data extraction.

Inclusion criteria are:

1. The study population contains adult patients who have undergone primary THA or will undergo primary THA.
2. Reports on trochanteric pain.
3. Reports on at least one of: prevalence, treatments, outcomes/prognosis, risk factors, or diagnosis of trochanteric pain.

Exclusion criteria are:

1. Hip fracture population.
2. Revision THA population.
3. Non-systematic reviews or expert opinion, such as narrative reviews, commentaries, and editorials.

Sources of Information

We will search Medline, Embase, CINAHL, and the Cochrane Library using the Ovid search interface. We will also search the reference lists of included studies for possible missed studies.

Search Strategy

We developed and conducted a systematic search strategy for each database with the assistance of a professional Health Sciences Librarian (L. Banfield). The full search strategy for Medline can be found in **Table 1**.

Table 1: Search strategy for Medline

Medline	
1	Arthroplasty, Replacement, Hip/
2	Arthroplasty, Replacement/
3	HIP/
4	Hip Joint/
5	(hip or hips).mp.
6	2 and (or/3-5)
7	((hip or hips) adj2 (arthroplast* or replace*)).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
8	1 or 6 or 7
9	exp PAIN/
10	pain*.mp.
11	inflammation/
12	inflam*.mp.
13	sore*.mp.
14	function*.mp.
15	discomfort.mp.
16	or/9-15

17	lateral.mp.
18	trochanter*.mp.
19	exp Bursitis/
20	bursitis.mp.
21	bursa.mp.
22	or/17-21
23	8 and 16 and 22
24	remove duplicates from 23

Study Selection

We will use the systematic review management software Rayyan (https://rayyan.qcri.org/welcome; Qatar Foundation) to assist with study screening. Two reviewers will independently review titles and abstracts. At the title and abstract stage, studies will be included if at least one reviewer decides to include the study. Two reviewers will independently review each full text article. At the full text review stage, reviewers will discuss all disagreements and come to a consensus. We will report inter-rater reliability (e.g. kappa) for inclusion at the full-text level.

Data Collection

We will develop a study-specific data extraction form and pilot test it on a random sample of 5 studies. Pilot reviewers will give feedback on clarity, completeness, and feasibility of completing the data extraction form. The study team will make any necessary adjustments and then two reviewers will independently extract data from all included studies. Variables to be extracted will include study characteristics (e.g. year, location, population, intervention(s), control group(s), outcomes), methodological characteristics (e.g. study design, sample size, level of evidence, methodological quality), and the outcomes of interest (prevalence, treatments, prognosis, diagnosis, and risk factors). A sample data extraction form is located in **Appendix A**.

Outcomes

Our outcomes of interest include

1. The prevalence of trochanteric pain.
2. The available treatments for trochanteric pain.
3. Clinical outcomes after trochanteric pain (prognosis).
4. The risk factors for trochanteric pain.
5. The methods available for diagnosing trochanteric pain.

Risk of Bias and Quality Assessment

We will report level of evidence, as defined by the Oxford Centre for Evidence-Based Medicine (OCEBM) 2011 Levels of Evidence (https://www.cebm.net/2016/05/ocebm-levels-of-evidence/). We anticipate that all included studies will be observational. Therefore, we will use the Methodological Index for Non-Randomized Studies (MINORS)[8] to evaluate risk of bias. If randomized studies are included, we will use the Cochrane Risk of Bias tool. Two reviewers will independently assess risk of bias and level of evidence. In the case of a disagreement, the reviewers will hold a consensus meeting and/or consult with a senior reviewer.

Data Synthesis

Our primary analysis will be descriptive. We will report the results of each study for each of the outcomes of interest. If methodologically appropriate (e.g. minimal heterogeneity) and if there are enough studies, we will pool results in a meta-analysis.

Prevalence

For the prevalence outcome, we will pool the total number of cases for each study as the numerator and the total sample size as the denominator, with 95% confidence interval.

Treatment

The treatment analysis will be descriptive only. We will report which treatments are used in each included study.

Prognosis/Outcomes

For prognosis, we do not expect that there will be a sufficient number of studies for each outcome to pool data, so that analysis will be descriptive. We will report any clinical outcomes that included studies report along with their effect estimates (e.g. relative risk [RR], odds ratio [OR], mean difference) and precision (e.g. confidence interval [CI]), where possible.

Risk Factors

This analysis will be descriptive. We will report the identified risk factors and protective factors with effect estimates and precision, where possible (e.g. adjusted/unadjusted OR and 95% CI).

Diagnosis

This analysis will be descriptive. We will report the diagnostic methods used in each study, with accuracy, when reported (e.g. diagnostic test accuracy, sensitivity, specificity).

Meta-Biases

Wherever possible, we will evaluate potential meta-biases using the GRADE[9] criteria. Specifically, we will evaluate each outcome of this review for risk of bias, inconsistency, indirectness, imprecision, publication bias, and other sources of meta-biases. We will specifically comment on sources of heterogeneity in the literature. These evaluations will be done primarily qualitatively, but if there is sufficient quantitative data to do so, we will compute I^2 statistics and generate funnel plots.

DISCUSSION

This study will add to the literature by comprehensively and systematically evaluating the available literature on trochanteric pain after THA. The previous literature has not been consistent regarding neither the diagnosis nor the description of trochanteric pain itself. This systematic review will help review the available diagnostic techniques and consolidate the language regarding this topic for future projects.

Previous studies have been conducted on the topic but they were not comprehensive or did not review the literature systematically. Additionally, our study will critically evaluate the methodological quality of the included studies, adding an evidence-based component to the review. This review will help orthopaedic surgeons better care for patients with trochanteric pain after THA, and will identify knowledge gaps for future research.

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The authors received no funding to complete this study. The authors declare that they have no competing interests. All authors made substantial contributions to the study conception or design. LB designed and executed the search strategies. All authors contributed to data acquisition, analysis, or interpretation. All authors were responsible for drafting the manuscript or revising it critically for important intellectual content. All authors approved the final version and agree to be accountable for all aspects of the work.

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First author last name: _____ Year of Publication ☐☐☐☐

Appendix A: Sample Data Extraction Form

Question	Response	
General Information		
Reviewer initials		
Region (check all that apply)	☐ North America ☐ Europe ☐ Asia ☐ Australia ☐ South America ☐ Africa	
Study design	☐ RCT ☐ Prospective cohort ☐ Retrospective cohort ☐ Case control ☐ Case series/case report ☐ Other (specify) _____	
Type of study	☐ Therapeutic/intervention ☐ Diagnostic ☐ Prognostic ☐ Economic ☐ Epidemiological/descriptive ☐ Other _____	
Level of evidence (based on Oxford CEBM criteria)	☐ I ☐ II ☐ III ☐ IV ☐ V ☐ Unclear	
Funding (check all that apply)	☐ None ☐ Industry ☐ Government ☐ Foundation/Association/Non-profit ☐ Not reported	
Population		
Sample size	Number enrolled	Number analyzed
Age (specify measure and variance)	☐ Mean (SD) ☐ Median (IQR) ☐ Categorical	
Female participants	Number	Percent
Pre-op or post-op THA	☐ Pre-op ☐ Post-op ☐ Both (specify % post-op) _____	
Anything else important about the population?		

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Prevalence		
What was the prevalence of trochanteric pain in the sample?	Numerator _____ Denominator _____	Percentage _____ Check here if not reported ☐
Interventions		
List the intervention(s) used to treat trochanteric pain.	Check here if there are none reported ☐	
Was there a comparison group? If so, describe (e.g. physiotherapy, standard of care, placebo).	Check here if there is no comparison group ☐	
Outcomes		
List all outcomes related to trochanteric pain with effect sizes and precision (e.g. OR and 95% CI).	Significant	Non-significant
Diagnosis		
List the modalities or methods used to diagnose trochanteric pain.	Check here if there are none reported ☐	
Diagnostic accuracy		Specify criterion standard
Sensitivity		
Specificity		
Other dx measure (specify) _____		
Risk Factors		
List the risk factors identified in the study with effect sizes and precision (e.g. OR and 95% CI)	Significant	Non-significant

Methodological Quality (MINORS)			
Clearly stated aim	☐ Not reported	☐ Inadequate	☐ Adequate
Inclusion of consecutive patients	☐ Not reported	☐ Inadequate	☐ Adequate

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Prospective collection of data	☐ Not reported	☐ Inadequate	☐ Adequate
Endpoints appropriate to aim of study	☐ Not reported	☐ Inadequate	☐ Adequate
Unbiased assessment of study endpoint	☐ Not reported	☐ Inadequate	☐ Adequate
Follow-up period appropriate for the aim of the study	☐ Not reported	☐ Inadequate	☐ Adequate
Loss to follow-up less than 5%	☐ Not reported	☐ Inadequate	☐ Adequate
Prospective calculation of study size	☐ Not reported	☐ Inadequate	☐ Adequate
Adequate control group	☐ Not reported	☐ Inadequate	☐ Adequate
Contemporary control group	☐ Not reported	☐ Inadequate	☐ Adequate
Baseline equivalence of groups	☐ Not reported	☐ Inadequate	☐ Adequate
Adequate statistical analysis	☐ Not reported	☐ Inadequate	☐ Adequate
Comments			
Additional comments (optional)			