

World Journal of *Orthopedics*

World J Orthop 2023 July 18; 14(7): 505-588



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Editorial Board Member of *World Journal of Orthopedics*, Farzin Halabchi, MD, Professor, Department of Sports and Exercise Medicine, Tehran University of Medical Sciences, Tehran 14395-578, Iran. fhalabchi@tums.ac.ir

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INDEXING/ABSTRACTING

WJO is now abstracted and indexed in PubMed, PubMed Central, Emerging Sources Citation Index (Web of Science), Scopus, Reference Citation Analysis, China National Knowledge Infrastructure, China Science and Technology Journal Database, and Superstar Journals Database. The 2023 Edition of Journal Citation Reports® cites the 2022 impact factor (IF) for WJO as 1.9; IF without journal self cites: 1.9; 5-year IF: 2.2; Journal Citation Indicator: 0.64. The WJO's CiteScore for 2022 is 2.6 and Scopus CiteScore rank 2022: Orthopedics and sports medicine is 145/298.

RESPONSIBLE EDITORS FOR THIS ISSUE

Production Editor: *Ying-Yi Yuan*, Production Department Director: *Xiang Li*, Editorial Office Director: *Jin-Lei Wang*.

NAME OF JOURNAL

World Journal of Orthopedics

ISSN

ISSN 2218-5836 (online)

LAUNCH DATE

November 18, 2010

FREQUENCY

Monthly

EDITORS-IN-CHIEF

Massimiliano Leigheb

EDITORIAL BOARD MEMBERS

<http://www.wjgnet.com/2218-5836/editorialboard.htm>

PUBLICATION DATE

July 18, 2023

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INSTRUCTIONS TO AUTHORS

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PUBLICATION ETHICS

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PUBLICATION MISCONDUCT

<https://www.wjgnet.com/bpg/gerinfo/208>

ARTICLE PROCESSING CHARGE

<https://www.wjgnet.com/bpg/gerinfo/242>

STEPS FOR SUBMITTING MANUSCRIPTS

<https://www.wjgnet.com/bpg/GerInfo/239>

ONLINE SUBMISSION

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Retrospective Cohort Study

Excision of trochanteric bursa during total hip replacement: Does it reduce the incidence of post-operative trochanteric bursitis?

Wai-Huang Teng, Adeel Ditta, Jane Webber, Oliver Pearce

Specialty type: Orthopedics

Provenance and peer review:

Unsolicited article; Externally peer reviewed.

Peer-review model: Single blind

Peer-review report's scientific quality classification

Grade A (Excellent): 0
Grade B (Very good): 0
Grade C (Good): C, C
Grade D (Fair): 0
Grade E (Poor): 0

P-Reviewer: Busso C, Italy; Willis-Owen C, Australia

Received: March 24, 2023

Peer-review started: March 24, 2023

First decision: May 9, 2023

Revised: May 20, 2023

Accepted: May 25, 2023

Article in press: May 25, 2023

Published online: July 18, 2023



Wai-Huang Teng, Adeel Ditta, Jane Webber, Oliver Pearce, Division of Trauma and Orthopaedics, Milton Keynes University Hospital, Milton Keynes MK6 5LD, United Kingdom

Corresponding author: Wai-Huang Teng, MBChB, Doctor, Surgeon, Division of Trauma and Orthopaedics, Milton Keynes University Hospital, Standing Way, Milton Keynes MK6 5LD, United Kingdom. waihuang0506@outlook.com

Abstract

BACKGROUND

Trochanteric bursitis is a common complication following total hip replacement (THR), and it is associated with high level of disability and poor quality of life. Excision of the trochanteric bursa prophylactically during THR could reduce the occurrence of post-operative trochanteric bursitis.

AIM

To evaluate whether synchronous trochanteric bursectomy at the time of THR affects the incidence of post-operative trochanteric bursitis.

METHODS

This retrospective cohort study was conducted in the secondary care setting at a large district general hospital. Between January 2010 and December 2020, 954 patients underwent elective primary THR by two contemporary arthroplasty surgeons, one excising the bursa and the other not (at the time of THR). All patients received the same post-operative rehabilitation and were followed up for 1 year. We reviewed all cases of trochanteric bursitis over this 11-year period to determine the incidence of post-THR bursitis. Two proportion Z-test was used to compare incidences of trochanteric bursitis between groups.

RESULTS

554 patients underwent synchronous trochanteric bursectomy at the time of THR whereas 400 patients did not. A total of 5 patients (incidence 0.5%) developed trochanteric bursitis following THR; 4 of whom had undergone bursectomy as part of their surgical approach, 1 who had not. There was no statistically significant difference between the two groups (Z value 1.00, 95%CI: -0.4% to 1.3%, $P = 0.32$). There were also 8 other patients who had both trochanteric bursitis and hip osteoarthritis prior to their THR; all of whom were treated with THR and synchronous trochanteric bursectomy, and 7 had resolution of their lateral buttock pains but 1 did not.

CONCLUSION

Synchronous trochanteric bursectomy during THR does not materially affect the incidence of post-operative bursitis. However, it is successful at treating patients with known trochanteric bursitis and osteoarthritis requiring THR.

Key Words: Total hip replacement; Trochanteric bursectomy; Trochanteric bursitis; Greater trochanteric pain syndrome

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Core Tip: We investigated a plausible theory of prophylactic trochanteric bursectomy at the time of total hip replacement (THR) to reduce the incidence of post-operative bursitis. Our retrospective study included 954 patients over an 11-year period operated by two contemporary surgeons, one excising the bursa and the other not. From our analysis, we found no significant difference in the incidence of post-THR bursitis between the two groups. However, our series did demonstrate that synchronous trochanteric bursectomy during THR is successful at treating the lateral buttock pain component for patients with known trochanteric bursitis and osteoarthritis requiring THR; and therefore, we recommend the procedure in these patients.

Citation: Teng WH, Ditta A, Webber J, Pearce O. Excision of trochanteric bursa during total hip replacement: Does it reduce the incidence of post-operative trochanteric bursitis? *World J Orthop* 2023; 14(7): 533-539

URL: <https://www.wjgnet.com/2218-5836/full/v14/i7/533.htm>

DOI: <https://dx.doi.org/10.5312/wjo.v14.i7.533>

INTRODUCTION

Hip osteoarthritis is a common painful condition of the groin and anteromedial thigh. It is one of the leading causes of elderly disability worldwide[1]. In fit patients, where medical treatment has been exhausted, total hip replacement (THR) offers the best chance of symptomatic relief and functional recovery. Trochanteric bursitis, on the other hand, is a condition of localised lateral buttock pain that can radiate down the lateral thigh, or into the posterior buttock, or both. Trochanteric bursitis is the most common cause of Greater Trochanteric Pain Syndrome (GTPS) in the literature. It is estimated to affect 17.6% of adults aged between 50-79 years[2], and associated with similar level of disability and poor quality of life as in severe osteoarthritis[3]. Trochanteric bursitis can occur primarily from repetitive stress or secondary to various hip, knee, or lower back pathologies. It is also common following THR, with an incidence of 4%-8%[4-8]. When sub-analysed according to surgical approach, several studies have reported lower incidence in those operated by posterior approach, as low as 1.2%[8], compared to anterior or lateral approaches[7-9].

For a decade, our lead author has performed trochanteric bursectomy as part of the surgical approach for all his THR. The rationale being that the bursa is likely to fibrose following surgery, losing its functional properties as friction buffer but still have the potential of developing bursitis at a later date. Therefore, its prophylactic excision seemed logical. This is a unique series based on a plausible supposition (that excision of the trochanteric bursa during THR would be preventative of later trochanteric bursitis) carried out by a single surgeon continuously for a decade and collecting outcome data contemporaneously. There are no similar papers in the literature.

This study compares the outcomes between patients who underwent THR with synchronous trochanteric bursectomy and those without (within the same department, and with the same post-operative rehabilitation protocol), looking in particular at the incidence of post-THR bursitis that required secondary care treatment. As part of the study, the overall incidence of trochanteric bursitis, the incidence of post-THR bursitis, and the incidence of symptomatic bursitis and hip osteoarthritis prior to THR were also investigated. In addition, for the latter subgroup (symptomatic bursitis and hip osteoarthritis), we assessed whether the bursectomy at the time of THR abolished the lateral buttock pains as well as the groin pains.

MATERIALS AND METHODS

Study population

This is a single-centre retrospective cohort study conducted within a secondary care setting. 954 consecutive patients who underwent elective primary THR by either of two consultant hip arthroplasty surgeons, one who performed THR with synchronous trochanteric bursectomy (Surgeon A) and the other without bursectomy (Surgeon B), between January 1, 2010 and December 31, 2020, were identified and included in the study. There are no exclusion criteria. Research ethics approval was not sought as the study was purely observational, and only included anonymised and non-sensitive data.

Total hip replacement

Both surgeons use the same posterior approach to the hip joint. Surgeon A routinely excises the trochanteric bursa as part of the surgical approach while Surgeon B does not. The bursa is left open at the end of the procedure without repair.

Both surgeons perform a curvilinear skin incision centred on the greater trochanter, followed by fascia lata incision in this line. At this point, Surgeon A excises the bursa using electrocautery and tension from forceps, whereas Surgeon B incises into the bursa to expose the trochanter and posterior structures to continue with the posterior approach to the hip. The remaining procedure follows the same logical sequence of a standard total hip replacement. Both surgeons perform a standard capsulotomy and detach the short external rotators to visualise the acetabulum, and femoral head and neck. The hip replacement is then performed. The short external rotators are re-attached using sutures, closing the capsule, and subsequent soft tissue structures closed in layers.

Anaesthesia and post-operative variables

Patients in the cohort had a combination of different anaesthetic techniques at the time of surgery, dependent on individual anaesthetist's decision-making-process. 70% of the patients received a spinal anaesthetic (with propofol or midazolam sedation) containing fentanyl with either a low dose diamorphine, or fentanyl as an adjunct. The remaining 30% had either both spinal and general anaesthetic (GA), or a straight GA in the form of Total Intravenous Anaesthesia. All patients had 0.125% Bupivacaine (no adrenaline) injected as Local Infiltration of Anaesthesia into the periarticular tissues, generally 100 mL, but a lower volume used for patients with a low body weight.

All patients were managed under the same enhanced recovery programme. Patients are mobilised either on the same day of surgery, or the following day, and are permitted full weight bearing. The mean length of stay has fallen over this 11-year period from 4.4 d to 2.5 d at the time of writing. The discharge criteria have not changed in this time. Patients must be able to independently walk 20 m on flat surface with crutches, safely get into and out of bed, safely get into and out of a chair, and pass the stairs test. A dry dressing is mandated before discharge. All patients were then followed up with the primary surgeon in an elective clinic 6 wk after the operation, and with the physiotherapist at 3 mo, 6 mo and 1 year. Any patients, at any stage, with problematic symptoms of hip or lateral buttock pain were booked back into the clinic of the operating surgeon as a matter of course.

Trochanteric bursitis

We used our institution's electronic patient records to identify any patient coded as having a diagnosis of trochanteric bursitis, injection into the trochanteric bursa, and/or trochanteric bursectomy. From this list, each patient's electronic patient record was reviewed to confirm the finding. The resulting list of confirmed cases of trochanteric bursitis (managed within the secondary care setting) was then compared with the list of total hip replacements by either of the two surgeons to generate a list of patients who had both a diagnosis of trochanteric bursitis and total hip replacement over the 11-year period. It also permitted the investigators to document the incidence of trochanteric bursitis independent of having a THR during this study period.

Statistical analysis

Data was collected and analysed in Microsoft Excel. Continuous variables with normal distribution were expressed in mean \pm SD. Two proportion Z-test was performed to compare the incidences of trochanteric bursitis between Surgeon A and Surgeon B. Continuity correction was not applied. Logistic regressions were carried out in R software v4.2.2. Results were considered statistically significant at $P \leq 0.05$.

RESULTS

From January 2010 to December 2020, 954 patients underwent primary total hip replacement by either of two consultant hip arthroplasty surgeons. Six patients underwent simultaneous bilateral uncemented THR, thus increasing the number of procedures to 960. Among these, 556 procedures had synchronous trochanteric bursectomy by Surgeon A as part of the surgical approach. Demographic and operative data are displayed in Table 1. 10.5% of patients did not turn up at their post-operative follow up with the primary surgeon, and hence were deemed lost to follow up. There is no significant difference in lost to follow up between surgeons ($P = 0.06$). The mean follow-up time for the entire cohort was 291 ± 115 d.

We identified a total of 152 cases of trochanteric bursitis at our institution over the 11-year period (independent of having hip osteoarthritis or THR, so the raw incidence). There were 16 patients who, on coding, had diagnoses of both THR and trochanteric bursitis. Of these 16 patients, 3 were for bursitis on the *contralateral* hip, 8 were pre-existing diagnosis of bursitis *prior* to THR, and 5 were identified to have developed bursitis *after* their THR (Table 2). The incidence of post-operative bursitis that required secondary care treatment in our series was therefore 0.5%. The mean interval between THR and diagnosis of bursitis was 412 days. Of these 5 patients; 4 patients had undergone a trochanteric bursectomy as part of the surgical approach (by Surgeon A), and 1 had not (by Surgeon B), corresponding to incidences of 0.72% and 0.25% respectively. Comparison using two proportion Z-test showed that there is no significant difference between the incidences of trochanteric bursitis following primary THR between Surgeon A and Surgeon B (Z value 1.00, 95%CI: -0.4% to 1.3%, $P = 0.32$).

There were 8 cases of trochanteric bursitis diagnosed prior to THR, all of which had synchronous trochanteric bursectomy by Surgeon A. Of them, 7 reported resolutions of symptoms following their hip procedures. But the 8th patient suffered a periprosthetic infection requiring staged revision surgery, confounding his outcome in the context of

Table 1 Patient demographic and operative data

Demographic	Surgeon A	Surgeon B
	Synchronous trochanteric bursectomy	Trochanteric bursa preserved
Number of patients	554	400
Age, mean \pm SD, yr	66 \pm 11.9	69 \pm 9.9
Gender		
Female	346	264
Male	208	136
Procedures		
Uncemented THR	329	195
Cemented THR	0	84
Hybrid THR (cemented femoral component)	227	125
Laterality		
Right	288	204
Left	264	192
Bilateral	2	4

Note that six patients underwent simultaneous bilateral total hip replacement, thus increasing the total number of procedures to 960. SD: Standard deviation; THR: Total hip replacement.

Table 2 Incidence of trochanteric bursitis

Trochanteric bursitis	Number of cases
Overall incidence (independent of osteoarthritis or THR)	152
Laterality	
Right	73
Left	53
Bilateral	26
Trochanteric bursitis <i>after</i> THR	
With synchronous trochanteric bursectomy	4
Trochanteric bursa preserved	1
Pre-existing diagnosis of bursitis <i>prior</i> to THR	
With synchronous trochanteric bursectomy	8
Trochanteric bursa preserved	0

THR: Total hip replacement.

this series.

DISCUSSION

Lateral buttock pain is a common presentation in orthopaedic practice. Historically, majority of these have been diagnosed as trochanteric bursitis. However, recent studies with use of modern imaging techniques have shown that not all had evidence of inflamed peri-trochanteric bursae[10,11]. Other diagnoses reported were abductor tendinosis, abductor tears, and thickened ilio-tibial bands. The overall diagnostic term for this cohort is Greater Trochanteric Pain Syndrome. GTPS is the current preferred term to describe tenderness over the greater trochanter, buttock, or lateral thigh. It is reported to affect between 10% and 25% of the general population[12], and 17.6% of adults aged between 50-79 years

[2].

Trochanteric bursitis, a subset of GTPS, is a common complication following primary total hip replacement. Our study reported an overall incidence of 0.5%, which is significantly lower than previous studies where incidences ranged from 4% to 8%[4-8]. However, it should be noted that the incidence of trochanteric bursitis varies with surgical approach. Vicar *et al*[5] and Schinsky *et al*[7] both reported highest incidence of post-THR bursitis with the historic trans-trochanteric approach. Iorio *et al*[8] compared direct lateral and posterior approaches, and found that the latter had lower incidence of post-THR bursitis, corresponding to 5.3% and 1.2% respectively. Interestingly, Shemesh *et al*[6] reported no significant difference in incidences of post-THR bursitis between direct anterior and posterior approaches. One study evaluated soft tissue changes following THR using magnetic resonance imaging and identified more frequent occurrence of fluid within the trochanteric bursa for direct lateral approach compared to anterior, anterolateral, and posterior approaches[13]. This may explain our low incidence of post-THR bursitis as the posterior approach appears to be 'protective' against trochanteric bursitis following THR.

Trochanteric bursectomy has been thoroughly examined in a recent systematic review[14]. Crutchfield *et al*[14] included 15 studies with a mean follow-up of at least 12 mo. Despite the variability in outcome measures, all reported outcomes indicate the same positive trend in post-operative improvement. Patient satisfactions were high at 95%, and rate of failure to improve pain were low, ranging from 0% to 8%. Among patients who underwent trochanteric bursectomy by arthroscopy, several studies[15-17], with minimum of 1 year follow-up, have reported similar positive outcomes ranging from 85% to 97%. In the study by Fox[17], one patient (3.7%) had recurrence of symptoms at 1 year and two additional patients (total 11%) had recurrence at 5 years. Van Hofwegen[18] evaluated arthroscopic bursectomy in 12 patients with trochanteric bursitis following THR and found significant improvement in pain scale. The positive outcomes of bursectomy were the reason that Surgeon A chose in 2010 to perform prophylactic trochanteric bursectomy, as part of the surgical approach, in all patients undergoing elective THR. The hypothesis being that without a trochanteric bursa, one would not go on to develop trochanteric bursitis later. This is a plausible hypothesis but would require large numbers in a consecutive series to demonstrate a difference given the low post-operative incidence of trochanteric bursitis.

In our series, trochanteric bursitis appeared to occur more frequently in patients who underwent THR with synchronous bursectomy (0.72%) compared to those without bursectomy (0.25%). This apparent difference is however not statistically significant. Even taking the confidence interval into account, we consider that the rates of trochanteric bursitis following THR is not materially different between the two groups. We therefore concluded that the procedure is unnecessary. Of note, however, our series did demonstrate that it is successful at treating the lateral buttock pain component for patients with known trochanteric bursitis and osteoarthritis requiring THR. We therefore recommend performing synchronous bursectomy in this specific patient group.

To check whether any differences in the two surgeons' bursitis rates were being masked by confounding by their cases having different characteristics, we carried out logistic regressions using the four factors in Table 1 (as covariates) and the identity of the surgeon as explanatory variables, and the outcome (post-THR bursitis) as the response. None of the logistic regression models, including possible combinations of these variables, had any statistically significant terms. This could be because there were too few post-THR bursitis cases to estimate the associations precisely enough, or it could be because in fact none of the covariates have an influence on the outcome.

There were a number of limitations to our study. This is a retrospective study where cases were identified using procedure codes. There is the potential for missed cases from uncoded diagnosis of trochanteric bursitis even though our lost to follow-up figures were only 10.5%. In addition, our study only included trochanteric bursitis managed within the secondary care setting. Patients who were solely managed in the primary care are not accounted for. The reported incidences in this series could therefore be underestimates, and the true incidence of post-THR bursitis may be higher than 0.5%. This study is also observational, and there may be other possible explanation for our conclusion as not all confounding factors have been accounted for, most notably confounding by surgeon. To improve on this, a prospective study randomising patients to bursectomy *vs* non-bursectomy at the time of planned THR, effectively a clinical trial, would be needed.

CONCLUSION

Synchronous trochanteric bursectomy at the time of THR does not materially affect the incidence of post-THR bursitis. It may therefore be considered unnecessary. However, our series did demonstrate that it is successful at treating the lateral buttock pain component for patients with known trochanteric bursitis and osteoarthritis requiring THR.

ARTICLE HIGHLIGHTS

Research background

Trochanteric bursitis is a common complication following total hip replacement (THR). It has a reported incidence of 4%-8% and is associated with high level of disability and poor quality of life.

Research motivation

For a decade, our lead author has performed prophylactic trochanteric bursectomy as part of the surgical approach for

THR. The rationale being that the bursa is likely to fibrose following THR, losing its functional properties as friction buffer but still have the potential of developing bursitis at a later date. The procedure, therefore, seems logical as it could reduce the occurrence of post-operative trochanteric bursitis.

Research objectives

The study was conducted to evaluate whether synchronous trochanteric bursectomy at the time of THR affects the incidence of post-operative trochanteric bursitis.

Research methods

This retrospective cohort study was conducted in the secondary care setting at a large district general hospital. Between January 2010 and December 2020, 954 patients underwent elective primary THR by two contemporary arthroplasty surgeons, one excising the bursa and the other not (at the time of THR). All patients received the same post-operative rehabilitation and were followed up for 1 year. We reviewed all cases of trochanteric bursitis over this 11-year period to determine the incidence of post-THR bursitis. Two proportion Z-test was used to compare incidences of trochanteric bursitis between groups.

Research results

554 patients underwent synchronous trochanteric bursectomy at the time of THR whereas 400 patients did not. A total of 5 patients (incidence 0.5%) developed trochanteric bursitis following THR; 4 of whom had undergone bursectomy as part of their surgical approach, 1 who had not. There was no statistically significant difference between the two groups (Z value 1.00, 95%CI: -0.4% to 1.3%, $P = 0.32$). There were also 8 other patients who had both trochanteric bursitis and hip osteoarthritis prior to their THR; all of whom were treated with THR and synchronous trochanteric bursectomy, and 7 had resolution of their lateral buttock pains but 1 did not.

Research conclusions

Synchronous trochanteric bursectomy at the time of THR does not materially affect the incidence of post-operative bursitis and may therefore be considered unnecessary. However, our series did show that it is successful at treating patients with known trochanteric bursitis and osteoarthritis requiring THR.

Research perspectives

Future research in the form of a clinical trial randomising patients to prophylactic trochanteric bursectomy *vs* non-bursectomy at the time of THR would be needed.

ACKNOWLEDGEMENTS

We would like to thank staffs of the Information Department at Milton Keynes University Hospital, particularly Ms Rita Handley (lead information analyst) for her assistance in this project. We also thank Emeritus Professor Kevin McConway from the School of Mathematics and Statistics at The Open University for his review of the statistical methods used in this study.

FOOTNOTES

Author contributions: All authors have substantial contributions to this study; Teng WH, Webber J and Pearce O conceptualised and designed the research; Teng WH and Ditta A collected, analysed, and interpreted the data; Teng WH, Ditta A, Webber J and Pearce O contributed to writing of the manuscript.

Institutional review board statement: The study was registered with our institution's Research and Development Department. Following review, it was confirmed that NHS Research Ethics Committee approval is not required.

Informed consent statement: Informed written consent was not obtained from individual patients as the study was purely observational, and only included anonymised and non-sensitive data.

Conflict-of-interest statement: All authors declare no conflict of interest related to the manuscript.

Data sharing statement: The original anonymous dataset is available on request from the corresponding author at waihuang0506@outlook.com.

STROBE statement: The authors have read the STROBE Statement, and the manuscript was prepared in accordance to the STROBE Statement – checklist of items.

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Country/Territory of origin: United Kingdom

ORCID number: Wai-Huang Teng 0000-0002-9624-0257; Adeel Ditta 0000-0002-2251-2053; Oliver Pearce 0000-0001-9584-1395.

S-Editor: Liu JH

L-Editor: A

P-Editor: Ji MX

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