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ASSOCIATION OF TOTAL KNEE ARTHROPLASTY WITH PREVIOUS KNEE ARTHROSCOPY: A PROSPECTIVE, OBSERVATIONAL-COHORT STUDY

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Abstract

Background

Before undergoing total knee arthroplasty (TKA), patients with symptomatic degenerative knee changes who are not yet candidates for TKA may undergo a knee arthroscopy (KA). At least 14 million Americans suffer from symptomatic osteoarthritis (OA) of the knee joint, making it a very common condition.

Objectives

The purpose of this study was to determine whether having had a knee arthroscopy in the past was linked to a higher risk of revision following total knee replacement.

Materials and methods

It was a prospective, observational-cohort study that took place at the Indira Gandhi Institute of Medical Sciences (IGIMS), Patna, Bihar, India. The study has been conducted for one year. The study took into account the data from 50 patients in total. Among all patients, 25 patients underwent KA before TKA, while other 25 participants were not undergoing KA before TKA.

Results

The average age of participants in the knee arthroscopy group was 55.6±12.9, while the average age of participants in the no knee arthroscopy group was 61.3±11.8. Most of the enrolled participants were female. Various other co-morbidities were assessed in both groups, including diabetes, hypertension, liver disease, anemia, alcohol dependency, smoking, depression, obesity, and chronic kidney disease. Post-operative stiffness and peri-prosthetic joint infection were found to be statistically significant.

Conclusion

An increased 2-year TKA revision rate is highly correlated with prior KA. Osteoarthritis was the most frequent cause of arthroscopy.

Recommendation

Further similar studies need to be done to assure the outcome of risk of revision after a previous knee arthroscopy.

Keywords: *Knee arthroscopy, Knee arthroplasty, Total knee replacement*
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Introduction

Patients with symptomatic degenerative knee changes who do not yet qualify for total knee arthroplasty (TKA) may have a knee arthroscopy (KA) before TKA [1]. To alleviate clinical symptoms and postpone TKA intervention, KA is still commonly performed on patients with knee osteoarthritis (KOA), despite the American Academy of Orthopaedic Surgeons' guidelines indicating that there is no benefit to the procedure. Approximately 2 million KAs were conducted annually for KOA worldwide, and this figure has been sharply rising over time [2, 3, 4, 5].

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At least 14 million Americans suffer from the very prevalent ailment known as osteoarthritis (OA) of the knee joint [6]. With a median diagnostic age of 55, many patients receive their diagnoses rather early in life [7]. Moreover, by the age of 60, 9.3% of Americans will have OA symptoms [7]. Before surgical care with total knee arthroplasty (TKA), the treatment protocol for knee OA often consisted of nonsurgical treatment such as joint injections, physical therapy, and pharmaceutical pain and anti-inflammatory drugs [8]. For the treatment of knee OA, KA combined with lavage and/or debridement is not advised by the American Academy of Orthopaedic Surgeons [4]. Nevertheless, arthroscopy is still commonly used to improve joint function and relieve discomfort in people with knee OA [9].

From 1996 to 2006, outpatient arthroscopic knee surgeries increased by 49%, according to the National Survey for Ambulatory Surgery [10]. In this study, the most frequent reasons for arthroscopy were osteoarthritis of the knee, ligamentous injury, lateral cartilage or meniscus pathology, patellar chondromalacia, and medial cartilage or meniscus pathology. Elderly individuals who undergo knee arthroscopies are at risk of developing TKA since many of them have some degree of concomitant OA that makes their symptoms worse. 2.6% of patients who had arthroscopic surgery for OA went on to have a total knee replacement annually, per a thorough analysis [11].

The effect of prior arthroscopic knee surgery on the results of initial total knee replacement has been the subject of several previous studies, some of which have found a negative effect [12, 13, 14] and others reporting equivalent outcomes [15, 16]. The greatest predictive factor for poor post-TKA outcomes among studies showing inferior outcomes in patients who had previously had arthroscopic surgery was a time between arthroscopy and TKA of less than six months [12, 14].

The purpose of this research was to determine whether having had a knee arthroscopy in the past was linked to a higher risk of revision following total knee replacement.

Methodology

Study Design

It was a prospective, observational cohort study that took place at the Indira Gandhi Institute of Medical Sciences (IGIMS), Patna, Bihar, India. The study was conducted for one year, from November 2023 to October 2024.

Study Population

A total data of 50 patients was considered in the study. Among all patients, 25 patients underwent KA before TKA, while the other 25 participants did not undergo KA before TKA.

Data Collection

Age, sex, medical comorbidities, and smoking status were among the demographic data gathered about the patients. Loosening of aseptic, manipulation performed under anesthesia, periprosthetic joint infection (PJI), Fractures around prosthetics, and stiffness following surgery at two years following initial total knee arthroplasty were among the other outcomes.

Statistical Analysis

SPSS version 24 software was used to perform univariate and multivariate analyses on patient demographic, comorbid, and surgical complications data. Data were presented as either mean±SD or n (%). An independent t-test was used to assess the significance of categorical variables. A value of less than 0.05 was used as a level of significance.

Ethical Consideration

Informed consent was taken from all participants.

Results

Table 1 depicts the basic demographics of enrolled participants. The average age of participants in the knee arthroscopy group was 55.6±12.9, while the average age of participants in the no knee arthroscopy group was 61.3±11.8. Most of the enrolled participants were female. Various other co-morbidities were assessed in both groups, including diabetes, hypertension, liver disease, anemia, alcohol dependency, smoking, depression, obesity, and chronic kidney disease.

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Table 1. Demographics of Enrolled Participants

Characteristics	Knee Arthroscopy (n=25)	No Knee Arthroscopy (n=25)	P-Value
Age (in years)	55.6±12.9	61.3±11.8	0.10
Male Participants	09 (36%)	07 (28%)	0.27
Female Participants	16 (64%)	18 (72%)	0.27
Diabetes	06 (24%)	11 (44%)	0.07
Hypertension	13 (52%)	16 (64%)	0.19
Liver Disease	02 (8%)	04 (16%)	0.19
Anemia	11 (44%)	13 (52%)	0.28
Alcohol Dependency	04 (16%)	07 (28%)	0.15
Smoking	08 (32%)	09 (36%)	0.38
Depression	02 (8%)	05 (20%)	0.11
Obesity	06 (24%)	11 (44%)	0.07
Chronic Kidney Disease	01 (4%)	03 (12%)	0.15

Data was presented as either mean±SD or n (%)

Table 2 shows the incidence of postoperative complications following TKA at two years. Various parameters were assessed, such as post-operative stiffness, manipulation under anesthesia, periprosthetic joint infection, aseptic loosening, and periprosthetic fracture. Post-operative stiffness and peri-prosthetic joint infection were found to be statistically significant with p-values of 0.03 and 0.01, respectively.

Table 2. Incidence of Postoperative Complications Following TKA at 2 Years

Parameters	Knee Arthroscopy (n=25)	No Knee Arthroscopy (n=25)	P-Value
Post-operative stiffness	02 (8%)	07 (28%)	**0.03**
Manipulation under anaesthesia	06 (24%)	11 (44%)	0.07
Periprosthetic Joint Infection	02 (8%)	09 (36%)	**0.01**
Aseptic Loosening	01 (4%)	03 (12%)	0.15
Periprosthetic Fracture	03 (12%)	09 (36%)	0.02

Data was presented as n (%)

Discussion

With around 2 million arthroscopic knee surgeries performed annually worldwide for degenerative knee disease, the modern arthroplasty surgeon will inevitably encounter patients who have undergone arthroscopy and are now candidates for TKA [17]. Surgeons in the US carried out around 1 million knee arthroscopic surgeries in 2006, which included over one lakh for patella chondromalacia, fifty 50,000 for knee OA, and nearly five lakhs for pathology for meniscal [10]. People who have undergone knee surgery or ligamentous reconstruction in the past are more prone to get osteoarthritis (OA) earlier in life, which raises the possibility that they will require a second arthroplasty [18].

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It is difficult to predict which individuals undergoing evaluation for arthroscopy will have poor outcomes and soon need arthroplasty. Numerous studies conducted in the past ten years have suggested that, in comparison to therapy and conservative management, for OA or degenerative meniscus injuries, arthroscopic surgery has minimal to no clinically meaningful impact. Individuals who have arthroscopies later in life and those with more severe OA are particularly at higher risk of acquiring TKA [17, 18, 19, 20]. One study used a two-surgeon independent evaluation system to determine if TKA or arthroscopy would be beneficial for patients over 50 with knee pain thought to be more linked to meniscal disease than OA. This was justified by the belief that older patients are more likely to convert to TKA [11, 21].

There is still debate in the literature on the connection between problems following total knee arthroscopy and previous arthroscopy. Two previous studies found that a short interval between arthroscopy and TKA is predictive of postoperative complications [22]. The study found that arthroscopy before TKA did not affect the improvement in the Knee Society score after TKA, range of motion, or complication-free survival [15].

All things considered, the available research points to arthroscopy's low effectiveness in treating cartilaginous disease and degenerative meniscus. Furthermore, elderly patients who get arthroscopy for these reasons have a significant progression rate to total knee arthroplasty. Previous arthroscopies may hurt TKA outcomes, especially if they are done soon after one another, according to the scant research on the topic before this study. The current investigation is the biggest to date to assess how arthroscopy affects TKA results.

Patients may benefit more from nonsurgical therapy of their degenerative pathology until they are ready for TKA, according to the study's findings, which show that arthroscopy before TKA dramatically increases the incidence of revision, PJI, aseptic loosening, and stiffness.

Conclusion

The study found a strong correlation between prior KA and an increase in the two-year TKA revision rate. Osteoarthritis was the most frequent cause of arthroscopy. Patients may benefit more from nonsurgical treatment of their degenerative pathology until they are ready for total knee arthroplasty, according to the study's findings, which show that arthroscopy before total knee arthroplasty significantly increases periprosthetic joint infection, aseptic loosening, and stiffness.

Limitations

The limitation of the study included the sample size, which could be inadequate. Also, the study was single-centric, which might result in the constraint of data. Putting this cohort through arthroscopy seems to have no effect and will likely result in worse outcomes if they ever need an arthroplasty.

Recommendations

Further similar studies need to be done to ensure the outcome of the risk of revision after a previous knee arthroscopy.

Acknowledgement

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Data Availability

Data is available upon request.

Author contributions

All authors contributed to the design of the research. AA and KR collected and analyzed the data. NKA and SK wrote the manuscript. AA and NKA edited the paper. All authors read and approved the paper.

List of abbreviations:

TKA- Total knee arthroplasty
KA- Knee arthroscopy
OA- Osteoarthritis
KOA- Knee osteoarthritis
PJI- Periprosthetic joint infection

Source of funding

No funding was received.

Conflict of interest

The authors have no conflicting interests to declare.

References

1. Gu A, Fassihi SC, Wessel LE, Kahlenberg C, Ast MP, Sculco PK, Nunley RM. Comparison of revision risk based on timing of knee arthroscopy before total knee arthroplasty. JBJS. 2021 Apr 21;103(8):660-7. https://doi.org/10.2106/JBJS.20.00218
2. Jevsevar DS. Treatment of osteoarthritis of the knee: evidence-based guideline. JAAOS-Journal of the American Academy of Orthopaedic Surgeons. 2013 Sep 1;21(9):571-6.

https://doi.org/10.5435/00124635-201309020-00008

3. Kim S, Bosque J, Meehan JP, Jamali A, Marder R. Increase in outpatient knee arthroscopy in the United States: a comparison of National Surveys of Ambulatory Surgery, 1996 and 2006. JBJS. 2011 Jun 1;93(11):994-1000. https://doi.org/10.2106/JBJS.I.01618
4. Siemieniuk RA, Harris IA, Agoritsas T, Poolman RW, Brignardello-Petersen R, Van de Velde S, Buchbinder R, Englund M, Lytvyn L, Quinlan C, Helsingen L. Arthroscopic surgery for degenerative knee arthritis and meniscal tears: a clinical practice guideline. Bmj. 2017 May 10;357. https://doi.org/10.1136/bmj.j1982
5. Viste A, Abdel MP, Ollivier M, Mara KC, Krych AJ, Berry DJ. Prior knee arthroscopy does not influence long-term total knee arthroplasty outcomes and survivorship. The Journal of Arthroplasty. 2017 Dec 1;32(12):3626-31. https://doi.org/10.1016/j.arth.2017.06.052
6. Deshpande BR, Katz JN, Solomon DH, Yelin EH, Hunter DJ, Messier SP, Suter LG, Losina E. Number of persons with symptomatic knee osteoarthritis in the US: impact of race and ethnicity, age, sex, and obesity. Arthritis care & research. 2016 Dec;68(12):1743-50. https://doi.org/10.1002/acr.22897
7. Losina E, Weinstein AM, Reichmann WM, Burbine SA, Solomon DH, Daigle ME, Rome BN, Chen SP, Hunter DJ, Suter LG, Jordan JM. Lifetime risk and age at diagnosis of symptomatic knee osteoarthritis in the US. Arthritis care & research. 2013 May;65(5):703-11. https://doi.org/10.1002/acr.21898
8. Bhatia D, Bejarano T, Novo M. Current interventions in the management of knee osteoarthritis. Journal of Pharmacy and Bioallied Sciences. 2013 Jan 1;5(1):30-8. https://doi.org/10.4103/0975-7406.106561
9. Ma JN, Li XL, Liang P, Yu SL. When can total knee arthroplasty be safely performed following prior arthroscopy?
10. Kim S, Bosque J, Meehan JP, Jamali A, Marder R. Increase in outpatient knee arthroscopy in the United States: a comparison of National Surveys of Ambulatory Surgery, 1996 and 2006. JBJS. 2011 Jun 1;93(11):994-1000. https://doi.org/10.2106/JBJS.I.01618
11. Winter AR, Collins JE, Katz JN. The likelihood of total knee arthroplasty following arthroscopic surgery for osteoarthritis: a systematic review. BMC musculoskeletal disorders. 2017 Dec;18:1-8. https://doi.org/10.1186/s12891-017-1765-0
12. Barton SB, McLauchlan GJ, Canty SJ. The incidence and impact of arthroscopy in the year before total knee arthroplasty. The Knee. 2017 Mar 1;24(2):396-401. https://doi.org/10.1016/j.knee.2016.12.003
13. Piedade SR, Pinaroli A, Servien E, Neyret P. Is previous knee arthroscopy related to worse results in primary total knee arthroplasty? Knee Surgery, Sports Traumatology, Arthroscopy. 2009 Apr;17(4):328-33. https://doi.org/10.1007/s00167-008-0669-9
14. Werner BC, Burrus MT, Novicoff WM, Browne JA. Total knee arthroplasty within six months after knee arthroscopy is associated with increased postoperative complications. The Journal of Arthroplasty. 2015 Aug 1;30(8):1313-6. https://doi.org/10.1016/j.arth.2015.02.023
15. Zmistowski B, Della Valle C, Bauer TW, Malizos KN, Alavi A, Bedair H, Booth RE, Choong P, Deirmengian C, Ehrlich GD, Gambir A. Diagnosis

of periprosthetic joint infection. The Journal of Arthroplasty. 2014 Feb 1;29(2):77-83. https://doi.org/10.1016/j.arth.2013.09.040

16. Issa K, Naziri Q, Johnson AJ, Pivec R, Bonutti PM, Mont MA. TKA results are not compromised by previous arthroscopic procedures. The journal of knee surgery. 2012 Jun;25(02):161-4. https://doi.org/10.1055/s-0032-1313755
17. Siemieniuk RA, Harris IA, Agoritsas T, Poolman RW, Brignardello-Petersen R, Van de Velde S, Buchbinder R, Englund M, Lytvyn L, Quinlan C, Helsingen L. Arthroscopic surgery for degenerative knee arthritis and meniscal tears: a clinical practice guideline. Bmj. 2017 May 10;357. https://doi.org/10.1136/bmj.j1982
18. Brophy RH, Gray BL, Nunley RM, Barrack RL, Clohisy JC. Total knee arthroplasty after previous knee surgery: expected interval and the effect on patient age. JBJS. 2014 May 21;96(10):801-5. https://doi.org/10.2106/JBJS.M.00105
19. Kise NJ, Risberg MA, Stensrud S, Ranstam J, Engebretsen L, Roos EM. Exercise therapy versus arthroscopic partial meniscectomy for degenerative meniscal tear in middle-aged patients: a randomized controlled trial with two-year follow-up. bmj. 2016 Jul 20;354. https://doi.org/10.1136/bmj.i3740
20. Moseley JB, O'Malley K, Petersen NJ, Menke TJ, Brody BA, Kuykendall DH, Hollingsworth JC, Ashton CM, Wray NP. A controlled trial of arthroscopic surgery for osteoarthritis of the knee. New England Journal of Medicine. 2002 Jul 11;347(2):81-8. https://doi.org/10.1056/NEJMoa013259
21. Sihvonen R, Paavola M, Malmivaara A, Itälä A, Joukainen A, Nurmi H, Kalske J, Järvinen TL. Arthroscopic partial meniscectomy versus sham surgery for a degenerative meniscal tear. New England Journal of Medicine. 2013 Dec 26;369(26):2515-24. https://doi.org/10.1056/NEJMoa1305189
22. Fedorka CJ, Cerynik DL, Tauberg B, Toossi N, Johanson NA. The relationship between knee arthroscopy and arthroplasty in patients under 65 years of age. The Journal of Arthroplasty. 2014 Feb 1;29(2):335-8. https://doi.org/10.1016/j.arth.2013.05.024

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