Management of Meniscal Tears: Costs and Timing of Surgery

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INTRODUCTION: Meniscal injuries of the knee are common and treatment strategies range from conservative management to surgery. The costs associated with these procedures are high and disease burden may be reduced by utilizing an evidence-based decision-making framework to manage patients with meniscal tears. The objectives of this study are to describe the costs associated with the management of meniscal tears in the two-year period following diagnosis and examine the relationship between patient characteristics and timing of surgery.

METHODS: An observational cohort study was conducted using the IBM Watson Health MarketScan databases (IBM Corporation). Patients aged 18 to 65 years who were diagnosed with a meniscal tear from January 1 to Dec 31, 2017, were included in the study. Patients with a concurrent knee osteoarthritis diagnosis or had switched insurance providers in the two-year period post-diagnosis were excluded. The primary outcome was the costs of meniscal tear-related procedures in the two-year period post-diagnosis. This includes deductibles, coinsurance, and net insurance payments (inflation-adjusted to July 1, 2020, dollars).

Procedures included were: (i) surgery: meniscectomy and meniscal repair, (ii) physical therapy (PT), (iii) medication: nonsteroidal anti-inflammatories, opioids, and acetaminophen, (iv) intra-articular injections: professional fee, hyaluronic acid, and corticosteroids, (v) imaging, and (vi) clinic visits to orthopaedic specialists. Patients were grouped as either having undergone no surgery (NS), early surgery (ES, surgery within three months of diagnosis), or late surgery (LS, more than three months after diagnosis, Figure 1). The cutoff period of three-months was chosen because majority of patients (>80%) who underwent surgery did so within this period (Figure 2).

Descriptive analyses were performed to compare the aggregate costs of all procedures that took place in the two-year post-diagnosis period, with differences compared using one-way analyses of variance or chi-squared tests. Multivariate logistic regression was performed to determine the likelihood of undergoing early surgery, and eventual surgery following three months of non-surgical management based on patient and injury characteristics.

RESULTS:

A total of 29,924 patients were included in the analysis, with mean ± standard deviation age of 43.9 ± 12.9 years, and 12,922 females (43.2%) (Table 1). 61.5% of patients did not undergo surgery, 31.8% underwent surgery early, and 6.8% underwent surgery late. Complex tears (36.6%) to the medial meniscus (58.8%) were the most common specified injuries. The average cost of management per patient was $3,835 ± 4,795 (Table 2). Costs were significantly lower in the NS group ($1,905 ± 3,175) compared ES ($6,759 ± 5,155) and LS ($7,649 ± 5,913), while the highest costs were observed in the LS group.

Patients who were male, older than 40, with a bucket handle tear, or lateral meniscal tear were more likely to undergo surgery early (Table 3). Among patients who were managed non-surgically for the first three months, those who were male, younger than 30, had a complex tear, or tear to the lateral meniscus were more likely to have surgery later (Table 4). Higher utilization of PT and medication in the three-month period post-diagnosis was also associated with a reduced likelihood of eventual surgery.

DISCUSSION AND CONCLUSION:

This study shows that the costs associated with the management of meniscal tears is substantial and could be attributed to a variety of procedures that patients undergo. Non-surgical management has the lowest cost burden and should be recommended for patients with appropriate indications. However, if surgery is required, it should be done earlier. Clinicians could consider utilizing a decision-making framework based on patient and injury characteristics to determine the necessity and timing of surgery. Further investigation into the validation of similar decision-making frameworks through prospective studies is warranted.