Development and Validation of a Patient Decision Aid for the Treatment of Ankle Arthritis

Oluseye I. Raymond, BA[1]
Kyla M. Cordrey, MD[1]
Nigel N. Hsu, MD[1]
Casey Jo Humbyrd, MD, MBE[2]

[1]Department of Orthopaedic Surgery,
The Johns Hopkins University
School of Medicine,
Baltimore, MD

[2]Department of Orthopaedic Surgery,
University of Pennsylvania,
Philadelphia, PA

Introduction

Health care is shifting toward a more patient-centered paradigm as patients take a more active role in the medical decision-making process[1]. This paradigm helps promote the patient's values and autonomy. Patient decision aids have begun to play an increasingly valuable role in decision making because of their ability to increase patients' involvement and likelihood of making informed, values-based choices[2]. In the field of orthopaedic surgery, decision aids of various formats, including short online interactive tools, brochures, videos, and booklets[3], have been developed for patients with hip and knee osteoarthritis. These tools result in improved patient knowledge, higher reported shared decision making, and lower decisional conflict[3].

To our knowledge, treatment decision aids are unavailable for patients with ankle arthritis. The decision process for ankle arthritis treatment is more complex than for hip or knee osteoarthritis because it is a 2-step process. For hip or knee arthritis, the decision revolves around whether to pursue surgery, with arthroplasty being the preferred operative treatment. For ankle arthritis, the patient must first decide whether to pursue surgery and then they must decide whether to pursue ankle arthroplasty or ankle arthrodesis. The goals of our study were to develop the Ankle Arthritis Patient Decision Aid[4-6] and to validate the tool in a representative patient population. We hypothesized that the decision aid would improve patient knowledge about ankle arthritis treatment options, and that patients would consider it to be a useful tool for the decision-making process.

Methods

Development of the Decision Aid

In August 2018 and September 2021, we performed a literature review using PubMed, CINHAL, and Embase with the assistance of a medical informationist and found that no patient decision aid had been described for end-stage ankle osteoarthritis. We then created the Ankle Arthritis Patient Decision Aid on the basis of the International Patient Decision Aid Standard and the Dell Medical School's Patient Decision template[7]. The decision aid used plain language and up-to-date scientific information. The tool scored 8.9 on the Flesch-Kincaid readability test[8], meaning that a reader would require higher than an 8th grade reading level (based on the US grade levels of 1–12) to understand the tool.

Survey Methods

Eighty patients of 2 surgeons at a US academic foot and ankle practice were recruited from October 2020 to June 2021 using an electronic medical record messaging system. Participants reviewed the tool and answered survey questions that evaluated its quality and factors affecting treatment choice in a hypothetical patient scenario in which they were asked to imagine they had advanced ankle osteoarthritis. We evaluated the tool decisional conflict scores on the Low Literacy Decisional Conflict Scale questionnaire[9] (maximum, 40 points, with higher scores indicating greater uncertainty), pre- and post-knowledge test scores (maximum, 8 points), and helpfulness scores (maximum, 7 points). We compared pre- and post-test knowledge scores using paired Student t-tests. Alpha = .05. Participants were provided with a free-response space at the end of the survey to provide additional, open-ended feedback on the decision aid.

Results

Knowledge Scores

The mean (± standard deviation) knowledge scores improved from 4.8 ± 1.2 (pre-test) to 6.7 ± 1.3 (post-test). The post-test knowledge scores were significantly higher than the pre-test scores, with a mean improvement of 1.9 ± 1.4 points after participants reviewed the decision aid ($P < .001$) (Table 1).

Decisional Conflict

When presented with a hypothetical patient scenario, 57 participants chose nonoperative treatment, 12 chose ankle arthrodesis, and 11 chose ankle arthroplasty. The mean (± standard deviation) decisional conflict score was

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Table 1. Treatment Choices, Decisional Conflict Scores, and Knowledge Scores for the Ankle Arthritis Patient Decision Aid

Parameter	Mean ± SD	P
Decisional conflict score[1]	4.1 ± 5.7	
Knowledge scores[2]		
Pre-test	4.8 ± 1.2	< .001
Post-test	6.7 ± 1.3	

SD, standard deviation.

[1]The decisional conflict score was calculated using the Low Literacy Decisional Conflict Scale, which consists of questions to assess choice difficulty. Higher scores indicate greater difficulty deciding decisively between treatment options (maximum score, 40 points).

[2]The knowledge score was the number of author-designed true/false questions covering the risks, benefits, and outcomes of the treatment options that each participant answered correctly (maximum score, 8 points).

4.1 ± 5.7, indicating minimal uncertainty when deciding (Table 1).

Factors Influencing Decision

The factors most frequently noted by participants as having "great" influence in their treatment choice were, "I would like to maintain a high level of activity" (73%, n = 58), "risk of surgical complications" (44%, n = 35), "recovery time" (41%, n = 33), and "risk of increased rate of arthritis in adjacent joints" (40%, n = 32) (Table 2). Factors that many participants indicated as having no influence on their choice were, "I know someone who has experienced ankle fusion" (79%, n = 63) and "I know someone who has experienced ankle replacement" (78%, n = 62) (Table 2).

Most participants in all age groups (except 75 and older) cited maintaining a high level of physical activity as a factor that greatly influenced their choice. Most participants who were greatly influenced by a desire to maintain a high level of activity chose nonoperative intervention (n = 36, 62%). Of those in this group who chose surgery, 11 (50%) chose ankle arthrodesis and 11 (50%) chose ankle arthroplasty.

Helpfulness

The mean helpfulness score was 5.9 ± 1.2. Most participants somewhat agreed (30%, n = 24) or strongly agreed (58%, n = 46) with the following statement: "The Ankle Arthritis Patient Decision Aid would be helpful if I actually had to decide between treatment options for ankle arthritis".

Decision Aid Quality

Fifty-eight participants (73%) thought the decision aid contained a balanced representation of the treatment options, and 57 (71%) found the amount of information presented to be "just right" (Table 4). Most participants (69%, n = 55) found the tool easy to understand. Twenty-one participants (26%) had medium difficulty understanding the tool. The mean quality rating was greater than 3 for each aspect of the decision aid (treatment option descriptions, advantages and disadvantages for each option, and the direct comparison of each option), suggesting that the tool contained information of good to excellent quality.

Discussion

The Ankle Arthritis Patient Decision Aid was created to support patients with advanced ankle osteoarthritis in choosing among ankle arthroplasty, ankle arthrodesis, and nonoperative treatment. Participants' knowledge of treatment options increased significantly after reviewing the decision aid, and decisional conflict was low. Factors that greatly affected participants' treatment choices included risk of complications, recovery time, risk of increased rate of arthritis in adjacent joints, and desire to maintain a high level of physical activity. Participants considered the decision aid to be helpful, unbiased, understandable, and containing high-quality information. The increase in knowledge scores, low decisional conflict scores, and overall positive evaluations of the Ankle Arthritis Patient Decision Aid support the validity of the tool.

When presented with a hypothetical scenario in which they were asked to imagine that they developed advanced ankle osteoarthritis, most participants chose nonoperative treatment. This finding is expected because nonoperative treatment is

Table 2. Common Considerations and Their Influence on Participant Decision-Making Regarding Nonoperative Treatment, Ankle Arthrodesis, and Ankle Arthroplasty for Treatment of Ankle Osteoarthritis.

Factor	Degree of Influence, N (%)		
	None	Some	Great
Recovery time	10 (13)	37 (46)	33 (41)
Risk of operative complications	8 (10)	37 (46)	35 (44)
I would like to maintain a high level of activity	6 (7.5)	16 (20)	58 (73)
I know someone who has experienced ankle replacement	62 (78)	8 (10)	10 (13)
I know someone who has experienced ankle fusion	63 (79)	10 (13)	7 (8.8)
Risk of wearing out the implant over time	16 (20)	45 (56)	19 (24)
Risk of increased rate of arthritis in adjacent joints	8 (10)	40 (50)	32 (40)

the first-line treatment for osteoarthritis[10]. Among those who chose operative treatment, similar proportions chose ankle arthrodesis and ankle arthroplasty. This similarity may suggest a need for more information regarding operative options or an indifference in opinion between the 2 choices. Of note, the factor most cited as having great influence in treatment choice was the desire to maintain a high level of physical activity. Of participants greatly influenced by a desire to maintain a high level of activity, 62% (n = 36) chose nonoperative intervention, whereas 71% (n = 57) of all participants chose nonoperative intervention. This finding suggests that patients who value physical activity may be more likely than those who live a more sedentary lifestyle to consider operative intervention. It is important for physicians to consider a patient's likelihood of returning to normal activity, as well as their goals, when evaluating treatment options.

Our study has several limitations. First, most participants were white, female, and older than 55 years, all of which may limit the generalizability of our results. However, age may be of little importance because osteoarthritis most commonly affects older individuals. Second, our recruitment of a patient population from orthopedic foot and ankle practices captures responses from individuals who likely have greater insight into and experience with foot and ankle conditions than the general population does. Third, patients who could not access the internet or read in English were excluded from the study. This exclusion also limits the generalizability of our results. Future directions for study include additional surveys targeting clinicians, patients with advanced osteoarthritis of the ankle, and patients who have undergone medical and surgical treatment for the disease. We hope to gain additional feedback regarding the breadth of information provided in the decision aid and to use it to further improve the tool. Additionally, creation of a digital form of the decision aid would improve accessibility.

Conclusions

The Ankle Arthritis Patient Decision Aid significantly improved patient knowledge regarding treatment options for ankle osteoarthritis and was considered by participants to be a helpful, unbiased, comprehensible tool that contained high-quality information. These results support the decision aid as an effective tool for helping patients with ankle osteoarthritis

in their treatment decision-making process. Participants cited risk of complications, recovery time, risk of increased rate of arthritis in adjacent joints, and desire to maintain a high level of physical activity as key factors influencing their treatment selection. Providers can support patients and practice patient-centered care by recognizing patients' values and providing tools such as the Ankle Arthritis Patient Decision Aid to better inform patients of their options.

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