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AAHKS Symposium: Patient Reported Outcome Measures: This is your New Reality

Building a Patient-Reported Outcome Metric Database: One Hospital's Experience



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ABSTRACT

Background: A number of provisions exist within the Patient Protection and Affordable Care Act that focus on improving the delivery of health care in the United States, including quality of care. From a total joint arthroplasty perspective, the issue of quality increasingly refers to quantifying patient-reported outcome metrics (PROMs). This article describes one hospital's experience in building and maintaining an electronic PROM database for a practice of 6 board-certified orthopedic surgeons.

Methods: The surgeons advocated to and worked with the hospital to contract with a joint registry database company and hire a research assistant. They implemented a standardized process for all surgical patients to fill out patient-reported outcome questionnaires at designated intervals.

Results: To date, the group has collected patient-reported outcome metric data for >4500 cases. The data are frequently used in different venues at the hospital including orthopedic quality metric and research meetings. In addition, the results were used to develop an annual outcome report. The annual report is given to patients and primary care providers, and portions of it are being used in discussions with insurance carriers.

Conclusion: Building an electronic database to collect PROMs is a group undertaking and requires a physician champion. A considerable amount of work needs to be done up front to make its introduction a success. Once established, a PROM database can provide a significant amount of information and data that can be effectively used in multiple capacities.

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The American Association of Hip and Knee Surgeons (AAHKS) and the American Board of Orthopedic Surgeons have worked to develop physician performance measures to address the care of patients undergoing both total hip and knee arthroplasty surgeries. AAHKS and American Academy of Orthopedic Surgeons (AAOS) have developed relationships with the Centers for Medicare and Medicaid Services and Yale New Haven Health Services Corporation/Center for Outcomes Research and Evaluation to identify patient-reported outcome instruments that will provide appropriate assessments of outcomes in a manner that is easily collected from patients. Building an electronic PROM database is crucial for orthopedic surgeons to successfully accomplish these goals.

The purpose of this article is to provide perspective as to how an orthopedic group worked with its hospital, Maine Medical Center (MMC) to acquire, build, and maintain a PROM database. In

addition, insight is provided as to challenges that arose and how they were managed during the process.

Materials and Methods

Maine Medical Partners Department of Orthopedic Surgery consists of 6 board-certified arthroplasty surgeons, 5 of which exclusively perform hip and knee arthroplasties. In 2015, the group performed 1704 primary and revision hip, knee, and shoulder arthroplasties. Each surgeon in the group is hospital employed (since 2012), sees patients in one centralized outpatient clinic in Falmouth, Maine, and performs total joint arthroplasties out of a dedicated 3-room operative wing at MMC in Portland, Maine. In 2012, the group had a paper medical record system. Patients filled out PROM questionnaires using pen and paper both preoperatively and postoperatively, and their results were filed into charts. No research personnel existed in the office to input this data nor was there an electronic database to capture and analyze this information. As a result, a tremendous wealth of information remained in patient charts.

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In late 2012, the group introduced the hospital to Ortech Data Centre, Inc (London, Ontario), a Canadian-based company that provides health information data capture, processing, and reporting systems. The company offered 2 modules; an OR Module for the collection of intraoperative data and a clinical module for patients to use independently. The author had experience working with this program during fellowship training at Hospital for Special Surgery and found the product very effective at building and maintaining a joint arthroplasty registry that captures not only implant information but also PROM data.

The first challenge that arose dealt with convincing the hospital as to the need and value of the product. The cost of acquiring the product for 6 surgeons was an initial cost of \$56,700 with an annual maintenance fee of \$36,630. However, the group realized that acquiring the product without having a dedicated research analyst would result in overall failure. This was due to the fact that the group had limited to no resources outside the clinical demands of the practice. Therefore, an added cost of a research analyst, with a salary of \$45,000 per year, was included when discussing the overall cost of the program with the hospital.

A number of meetings were held with hospital administrators to discuss purchasing the program and hiring a research analyst. Approximately 6 meetings were held over the course of 6 months with the Vice President of Surgical Services at MMC. The consistent message the group delivered to the hospital was that acquiring the product would help to improve patient outcomes by enabling the office to more effectively collect, store, aggregate, analyze, and ultimately act on PROM data. Additional benefits highlighted included improving the ability to conduct new clinically based research, using quality metric data from the program for better

leverage when discussing the possibilities of commercial packaged pricing for joint arthroplasty, and finally using the results as a transparent way to benchmark our performance against other hospitals that collect similar quality metric and PROM data. We worked with the Senior Director of Surgical Practice Operations to hire the research analyst. The hospital ultimately agreed to purchase the program and hire a research analyst in the fall of 2013.

The next challenge that arose was deciding on what PROMs to collect. A number of group meetings were held where we agreed on certain principles that included only using validated PROM questionnaires that minimized the number of questions patients need to answer. The group was sensitive to the fact that our patients already were asked to fill out many forms and answer a number of questions as part of our hospital's meaningful use initiative. After considerable discussion, we agreed to use the PROMIS questionnaire for evaluating general health; the Modified Oxford Hip and Modified Oxford Knee [1] to evaluate hip and knee outcomes, respectively; the University of California, Los Angeles activity score [2]; and the visual analog pain score. This resulted in a total number of 24 questions patients needed to answer.

Establishing a workflow was the next challenge. Because the group has offices in one location, we were able to streamline our data intake process. Patients indicated for joint arthroplasty completes their respective preoperative PROM after their history and physical examination that is performed approximately 2 weeks before surgery. When finished with the history and physical examination, the physician assistant or nurse practitioner brings the patient to meet with the research analyst. The patient is given a tablet (the office purchased 3) that has the patient's demographic data pre-entered, and the patient then completes

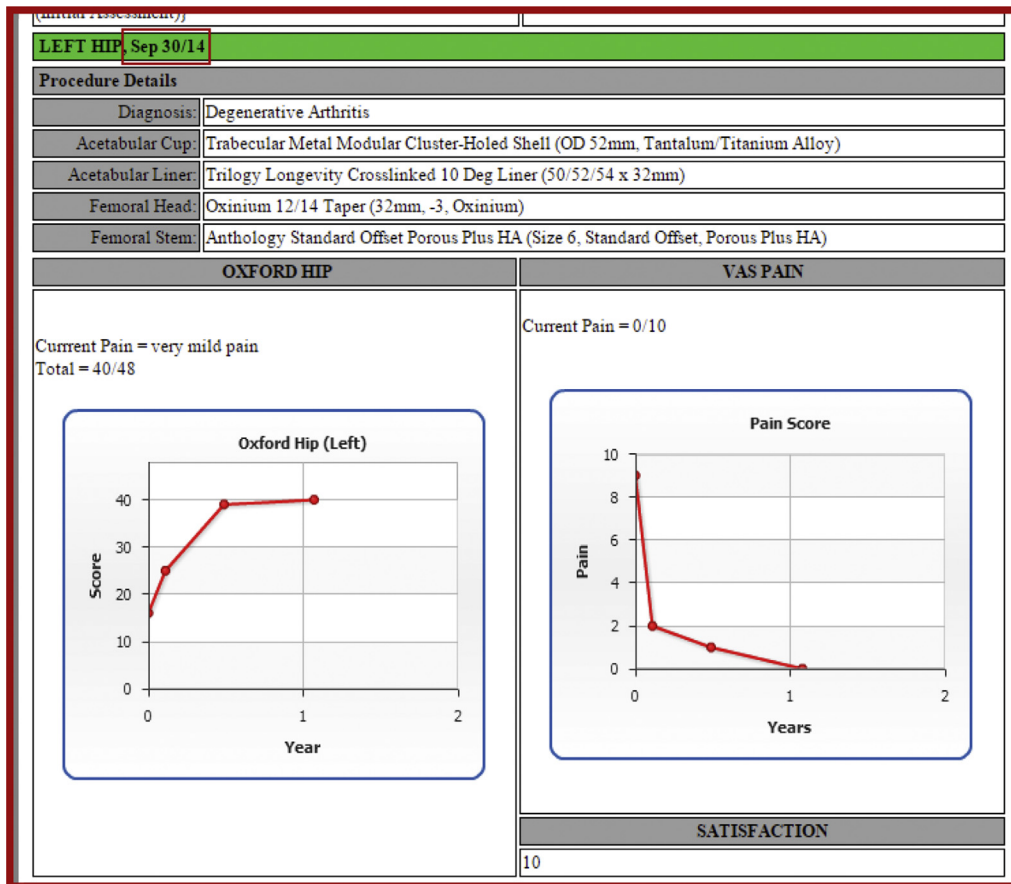


Fig. 1. Individual-level patient-reported outcome metric results.

	Mean Pre-op			Mean 1 Year			
	Oxford	VAS Pain	UCLA Score	Oxford	VAS pain	UCLA	Satisfaction
Surgeon 1	23	5.9	4.5	44.6	0.7	6.5	9.5
Surgeon 2	22	6.3	4.1	42.7	1.0	6.1	9.3
Surgeon 3	18.2	6.4	3.8	42.6	0.8	5.8	9.2

Fig. 2. Mean patient-reported outcome metric results stratified by surgeons. VAS, visual analog scale; UCLA, University of Los Angeles, California.

the PROM questionnaire. In total, the questions take approximately 5-7 minutes to complete, and the research analyst is present to answer any questions a patient may have during the process. The patient also signs an electronic informed consent to allow for the use of data in any future research-related work. The patient's email address is also captured for future electronic correspondence.

Postoperative PROM data are captured at 6 weeks, 3 months, 1 year, 2 years, and 5 years postoperatively. If patients have an email address in the system, they are automatically emailed at the post-operative time period and prompted to fill out the questionnaire. In addition, patients are emailed questionnaires 1 week before their office appointment. At the beginning of the week, the research analyst reviews each surgeon and midlevels' daily clinic schedule to see which patients have and have not completed their PROM questionnaire. Patients that have not completed the questionnaire are flagged by the research analyst. A second email is then sent to those patients. If they still do not complete the questionnaire, then the research analyst attempts to meet with them after their office appointment.

Results

Since the establishment of this database in December 2013, we have collected PROM data for >4500 cases. These include primary and revision hip, knee, and shoulder arthroplasties. In 2015, we had an approximate 91% capture rate preoperatively with 60% of patients filling out questionnaires at 6 weeks and 70% completing 1-year PROM questionnaires. One area we have been working to improve on is having patients fill out questionnaires via e-mail before their postoperative office visit. Currently, this capture rate for all postoperative follow-up times is approximately 40%. We have begun to address this issue more proactively with our research analyst reaching out to patients before their 6-week or 1-year visit first via email and then via a phone call. To date, we do not have results with this more proactive approach.

Figure 1 demonstrates how we can graphically present patients' PROM data at their follow-up office visit. They can see both their preoperative and postoperative functional, pain, and satisfaction scores. Providing information in this visual manner has helped to improve patient engagement at the office visit. As a result, we have seen an increase in patient satisfaction, although we have not been able to objectify this improvement.

In addition to providing individual results, the PROM database allows our group to aggregate our results and look at scores overall, as a group, or stratified by variables of interest. Figure 2 provides a summary of PROM results by surgeons, whereas Figure 3

aggregates our results for University of California, Los Angeles Activity Score as a group.

We have used results from this database in different venues at the hospital ranging from monthly orthopedic quality metric meetings that are attended by orthopedic surgeons along with representatives from anesthesia, nursing, physical therapy, and case management. In addition, we use the PROM analysis at quarterly group research meetings. Finally, the results have been used to develop our annual outcome report that highlights our prior year's outcomes including surgical volume, complications, readmissions, length of stay, discharge disposition, and PROM results. This annual report is given to patients and primary care providers, and portions of it are being used in discussions with insurance carriers.

Discussion

Building an electronic database to collect PROM metrics is a group undertaking and requires a physician champion. A

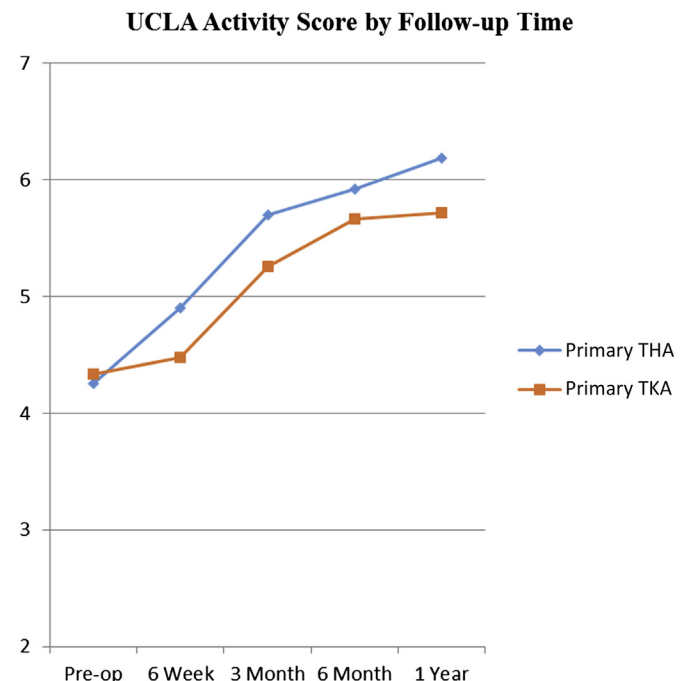


Fig. 3. Aggregate University of California, Los Angeles (UCLA) scores from total hip arthroplasty (THA) and total knee arthroplasty (TKA) patients.

considerable amount of work needs to be done up front to make its introduction a success. Establishing surgeon and hospital buy-in is critical, along with developing a fluid workflow. As our undertaking highlights, there is a considerable investment that needs to be made, both for the program and for a research analyst. Determining who pays for this investment, the hospital, the group, or both, is a discussion that needs to occur up front. In our experience, identifying the right research analyst is imperative to the success of building and maintaining a PROM database because of the amount of time and energy needed to get it off the ground and maintain it.

In terms of future directions, we are looking to centralize our database. Currently, we have our PROM database and the hospital's electronic medical record. We would like to move to the hospital's electronic medical record; however, it does not allow the same functionality as our PROM system. In addition, beginning in January 2016, we have changed 2 of our PROM questionnaires from the Oxford Hip and Knee scores to the HOOS JR (6 questions) and KOOS JR (7 questions) based on work performed

by Dr Lyman at the Hospital for Special Surgery and endorsed by AAHKS [3].

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