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CORR Insights®: Current Status of Cost Utility Analyses in Total Joint Arthroplasty: A Systematic Review

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Where Are We Now?

Nwachukwu and colleagues have accurately gauged the state of knowledge within the joint arthroplasty literature relating to a segment of healthcare economics known as cost-utility analysis. It is a meaningful contribution for two

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reasons. First, it reflects a trend toward greater focus on quantifiably assessing the economic impact of this high cost orthopaedic intervention from multiple perspectives. Second, it indicates the evolution toward studies that have relevance to a healthcare economy that has shifted toward patient-centered and self-directed care. Cost utility analysis is a subset of cost-effectiveness research that accounts for the individual's measure of health benefit resulting from an intervention of known incremental cost. This “utility” is typically expressed in terms of quality adjusted life-years (QALY). This is used increasingly to compare the impact of different interventions, and is often expressed as an incremental cost-effectiveness ratio. This framework for evaluating the practical benefit of joint restoration procedures has grown beyond the health policy research segment of orthopaedics and has now gaining widespread

acceptance in the clinical arthroplasty community.

Aside from reporting the recent growth of cost utility studies in this literature, one of the key contributions of the study by Nwachukwu and colleagues is the application of objectivity in evaluating study quality. Through the use of the Quality of Health Economic Studies instrument, the authors introduce a new standard for evaluating the practical relevance of cost utility analyses in the joint arthroplasty literature. The other key contribution is in identifying the gap in the literature involving studies that compare operative and non-operative interventions for arthritic conditions of the hip and knee. The authors note that patients presenting for joint arthroplasty have already failed nonoperative treatment as a potential reason for this finding.

Where Do We Need To Go?

The current controversies and barriers to advancement in cost utility analyses in joint arthroplasty can be considered in relation to how cost and quality are

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viewed in the “cost effectiveness ratio.” From the standpoint of the numerator, the cost-accounting systems currently used within the focal health-care systems where joint arthroplasty is performed present significant barriers to accurate cost identification for health-care economic research. These systems support the financial needs and reimbursement strategy of the organization in allocating a portion of system costs to a procedure through “cost to charge ratios” and other healthcare cost accounting techniques. However, they rarely track the “activity-based” costs that accurately depict the resource use for a procedure and capture only the costs that are relevant to the organization’s mission. As such, excessive dependence on the current healthcare cost accounting systems often distorts or limits our cost utility analyses. Using activity-based accounting principles in orthopaedic health economic research to derive actual and benchmark costs offers great potential for advancing cost utility analyses in joint arthroplasty. However, activity-based costing is resource intensive so the research community may need to explore shared services that may make this approach more affordable.

While assigning a quantifiable value for an intervention (in the denominator) is inherently subjective, the reliability of patient-based quality of life instruments to accurately reflect this personal value remains controversial. Likewise, there are numerous problems associated with capturing patient-driven “trade-offs” or value assignment with an intervention for the purpose of a quality-adjusted life year calculation. Related to both of these is the ubiquitous challenge of handling predictive uncertainty inherent in this kind of research through appropriate probabilistic modeling tools. Finally, there is an ongoing challenge in establishing a “gold standard” for determining the quality of the research output itself.

How Do We Get There?

Economic research, specifically cost utility analyses, in joint arthroplasty must develop with the related goals of both resolving the existing controversies and meeting the need for practical decision support tools in a value-based healthcare economy. Cost inputs and quality outputs must be standardized

through studies that focus specifically on the reliability of these measures to accurately reflect the variables in the cost-quality equation across different interventions. Similarly, objective tools, such as the Quality of Health Economic Studies instrument referenced above, must be developed to objectively qualify standardized financial inputs and quality outputs as “gold standard” approaches. As the imperative for patient-centered care converges with the trend toward greater personal financial responsibility for health services, there is a critical need to grow economic research designed to inform decision support and individual patient choice regarding various treatment options. This is particularly important in elective joint arthroplasty where the cost burden is enormous and personal choice drives the entire cost. One compelling direction includes establishing cost utility studies specifically designed for elective procedures that are weighted toward patient preference and willingness to pay. This would offer alignment between the study population and dependent variables in evaluating the intrinsic value of the intervention.