Assessing Patient Utilities for Varying Degrees of Low Back Pain[1]

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Rationale and Objectives. We sought to quantify patient preferences for mild, moderate, and severe low back pain via time-tradeoff analysis and utility measurement.

Materials and Methods. Forty-one patients being treated for low back pain in a tertiary care teaching hospital participated in the study. Patients were asked to decide which of three health states they were currently experiencing as well as which of the three health states was the worst experienced during their lifetime. A time-tradeoff analysis was performed, during which patients were asked the amount of time in each of the health states they would exchange for complete resolution of symptoms. We correlated (1) subjects' current health state with reported utility and (2) degree of previous low back pain with results of time-tradeoff measurements.

Results. All patients were willing to trade a greater number of life-years for resolution of symptoms given a more severe perceived health state. Utility decreased as severity of back pain scenarios increased, with an average utility of 0.93 ± 0.11 for mild, 0.65 ± 0.21 for moderate, and 0.18 ± 0.17 for severe pain. No significant difference in time-tradeoff among subjects was identified based upon current health state on the day of interview. A statistically significant difference was seen in patients' willingness to trade time among those who had actually experienced severe pain versus those who had not. Kendall's correlation revealed that subjects who had experienced severe back pain exhibited significantly lower utilities ($P < 0.01$) compared with subjects who had never experienced severe pain.

Conclusions. As expected, patients with severe low back pain were willing to sacrifice more potential years of life for resolution of symptoms, suggesting time-tradeoff can accurately reflect patient utility. 2. However, we found no correlation between a subject's current health state and reported utility.

Key Words. Utility; time-tradeoff; back pain.

Low back pain is a significant cause of morbidity and loss of work in the United States, as well as the world (1–3). The annual prevalence of low back pain has been estimated at upward of 60%, with a lifetime prevalence of approximately 80% (4). An estimated 2% to 5% of American adults visit a physician or miss work as a result of their low back pain every year (4). Back pain is cited as the second leading symptomatic reason for physician office visits (5) and is the most common reason for filing workers' compensation claims in the United States (6). "Medical back problems" were the third most common indication for hospital admissions in 1990 (7). Colleagues from our institution have shown recently that patients suffering from back pack incur over $90 billion in health care expenditures per year, with their incremental expenditures specifically related to back pain totaling over $26 million per year (8). In short, low back pain is a major health issue facing the world's population.

A number of techniques and interventions have been designed to manage and treat back pain. Several of these techniques, such as selective nerve root blocks and epi-

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dural steroid injections, are now being routinely performed by radiologists under imaging guidance. These techniques are often used as a bridge between conservative (medical) management and more invasive surgical interventions such as discectomy (9–11). According to the 1999 National Hospital Discharge Survey, approximately 100,000 spinal injections and over 300,000 discectomies were performed in the United States during the previous year (12).

With the number of procedures performed growing each year and likely thousands of symptomatic people going untreated (4), it is important to quantify how much benefit patients derive from these therapies weighed against the risks of the procedures. Moreover, the fact that radiologists are being asked to intervene more frequently should serve as ample justification for the development of greater insight into clinical and functional evaluation of back pain by radiologists. Furthermore, outcomes research within radiology is a developing field, with wide variation in methodology and applicability (13,14). This study uses the tools, time-tradeoff analysis (TTO) and utility measurement, in an attempt to quantify patient preferences for varying degrees of low back pain.

Numerous studies have been conducted in attempts to determine the efficacies of various low back pain therapies (15–23). Efficacy studies often report results of treatment as duration of benefit or as amount of interval improvement in pain scores. Most of these trials focus on reporting qualitative changes in pain following treatment. For example, Lewis et al. (19) found that at a minimum of 5 years postoperatively, 62% of patients who had undergone discectomy reported complete relief of back pain. However, in the same study at 5 to 10 years, 9% of patients who had undergone discectomy reported that back pain was as severe as or worse than that preoperatively (19). In another study examining efficacy as judged by pain relief, Dilke et al. (24) found that at 3-month follow-up, 21 of 35 patients (60%) who underwent epidural steroid injections reported relief of their pain compared with 11 of 36 (31%) patients given physiologic saline. Patients self-reported their pain relief on a scale of "severe," "not severe," "none," or "unknown."

Some authors have suggested that measurement of pain should not be the only factor used to determine a patient's true health outcome (25). In order to determine how much "benefit" is derived from these varying degrees of improvement, a more universal measure is needed. We have chosen to investigate patient utilities. This type of information is necessary in order to perform analyses beyond simple efficacy, such as in cost-effectiveness analysis, where quality-adjusted life-years is the normative term (26).

In order to properly assess the usefulness of these procedures, it is optimal to determine patient utilities. Utility is a concept that is used in various fields, particularly in economics as well as decision analysis. It is an attempt to accurately represent the level of satisfaction experienced by the consumer of a good or service (27,28). Utility is an important measurement that can give health care providers insight into the true benefit of performing these procedures. To comprehend a patient's probable benefit from a procedure, one needs to understand medical information about various outcomes in addition to the value that these outcomes provide to the patient (29). Utility is typically scored on a cardinal scale of 0 to 1.0, where 0 represents the least desirable health state (usually death), and 1.0 represents the most desirable state (usually perfect health) (26,30). To ascertain utility, patient preference is not determined by direct measurement but rather is derived by analyzing the choices that patients would make under certain hypothetical conditions. Two main tools are used to measure the utility of health states: the standard gamble method and the time-tradeoff method (9,27). In the standard gamble method, subjects are asked to compare a sure outcome (the health state to be evaluated) with a gamble having a probability p of the best possible outcome (perfect health) and $(1 - p)$ of the worst possible outcome (usually death). The utility of the health state is the value of p at which the subject is indifferent between the health state and the gamble. As the probability p decreases, patient preference for the current health state decreases. We chose to use the time-tradeoff method to determine the utilities of varying degrees of back pain. In the time-tradeoff method, the subject is asked how much time x in a state of perfect health he considers equivalent to a period y in ill health. The determined utility is calculated by x/y. As time x, and therefore quantity x/y, decreases, patient preference for the ill health state decreases. We chose this method because some patients experience difficulty in understanding probabilities and the instructions for standard gamble, and the time-tradeoff, is often used in its place to determine utilities (27). Studies have been conducted investigating the efficacies of different treatment options for low back pain. However, many of these studies have not included quality of life assessments (31).

This study had three prospective hypotheses: (1) patients would exhibit lower utilities for worse health states;