Cost Effectiveness of the Anterolateral Method of Hip Replacement
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Over the past seven years, Maine Medical Center (MMC) has developed a unique protocol for total hip replacement surgery. Three orthopedic surgeons at MMC perform a minimally invasive variant of hip replacement called the anterolateral approach. This muscle sparing approach is thought to directly benefit the patient in several ways including shorter length of stay, lower medical costs, and a greater likelihood of direct discharge home.

The purpose of my research was to perform an economic analysis of health outcomes to determine the cost effectiveness of the anterolateral approach. In order to carry out this task, I sought to make use of regression analysis, an econometric technique that controls for the effects of many explanatory variables in order to isolate the effect of each individual variable. The principal dataset used was an extract from a 2011 Maine all-providers insurance database.

The theoretical framework developed included many dependent variables, each corresponding to a health outcome. These variables included total costs within 90 days of the hip replacement operation, length of stay for the initial operation, complications, revision of the hip replacement, physical therapy, discharge status (i.e. home, nursing facility, home with care), and readmission. The explanatory variables in the model could be sorted into four broad categories. Firstly, the model accounted for patient characteristics including age, sex, comorbidities, and home environment. Secondly, the model accounted for hospital characteristics like hospital volume. Thirdly, the model accounted for surgeon characteristics including years of practice, fellowship training, medical degree type, and surgeon volume. Finally, the model included the variable of interest – surgical technique.

First, I began fine-tuning this theoretical framework and operationalizing the dataset. In particular, I worked with the orthopedic team at Maine Medical Center to determine which comorbidities to include in the model. These were patient conditions like hypertension, chronic kidney disease, or diabetes that could affect the outcome of a hip replacement. I compiled a similar set of relevant surgical complications such as pulmonary embolism and deep vein thrombosis to be used as outcome measures. I then developed algorithms for extracting these and all of the other variables on a patient-by-patient basis from the insurance claims data.

Once the theoretical framework was fully developed and the dataset was operationalized, I began to run regression analyses. Using STATA software, I ran regressions for the length of stay outcome and analyzed coefficients and t-statistics. While it is too soon to state conclusively the effects of the variable of interest – surgical technique, preliminary results of the regression are promising and descriptive statistics are in keeping with the notion that the anterolateral method has a desirable effect on health outcomes. In a time when costs and efficiency are shaping medicine just as much as science and technology, this study should provide valuable insight into the future of hip replacement surgery.

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