

Weekend versus Weekday Procedures for Total Hip Arthroplasties

Shawn Okpara, David A Momtaz, Tucker Cushing¹, Abdullah Ghali, Travis Mark Kotzur², Parker Mitchell, Albert Han, Adam Dylan Pearl, Varun Bora, Ali Seifi, Khaled J Saleh³

¹Baylor College of Medicine, ²University of Texas Health San Antonio, ³Saleh Medical Innovations Consulting PLLC

INTRODUCTION:

The “weekend effect” is the phenomenon that claims increased adverse outcomes for weekend procedures compared to weekday procedures. However, there is significant controversy regarding such disparities for elective orthopaedic surgeries. With the increasing demand of hip arthroplasty projected over the next 20 years, it is important to investigate a possible “weekend effect” to optimize outcomes and cost effectiveness. In this study, we investigate the association between weekday versus weekend total hip arthroplasty (THA) and postoperative outcomes using Healthcare Cost and Utilization Project (HCUP) data. We hypothesize that patients who undergo THA on weekdays will have better postoperative outcomes compared to those who undergo weekend procedures, specifically in regard to healthcare costs and length of stay.

METHODS:

We performed a retrospective analysis of the HCUP database between 2002-2020 comparing THAs done Monday to Friday versus THAs done Saturday to Sunday. Data collected included patient demographics, comorbidities, hospital length of stay, admission to procedure time, discharge disposition, mortality, and postoperative outcome data. Normally distributed data were compared with independent sample t-tests. Non-normally distributed data were compared using Wilcoxon rank-sum. Categorical variables were analyzed with Fisher’s Exact Test or Chi Square with Kendall Tau. Odds ratios were also reported in our statistical analysis. Variables with $p < 0.05$ were considered statistically significant in our analysis.

RESULTS:

In total, there were 872,584 subjects from the Healthcare Cost and Utilization Project (HCUP) database who had undergone a total hip arthroplasty from 2002-2020 available for analysis, with 3,517 individuals in the weekend group and 869,067 in the weekday group. The weekday group exhibited a significantly shorter time to procedure when compared to the weekend cohort (1.32 hours versus 14.04 hours, respectively; $p < 0.001$). Upon completion of THA, the weekend cohort was found to have a greater length of stay compared to the weekday cohort (4.32 ± 3.43 days weekend versus 3.044 ± 1.92 days weekday; $p < 0.001$). Additionally, weekend cases were significantly more expensive compared to weekday cases, costing on average about \$8,602.16 more (17% higher; $p < 0.001$).

DISCUSSION AND CONCLUSION:

We found that THAs performed on weekends were associated with significantly increased length of stay, total charges, admission-to-procedure time, and mortality compared to those on weekdays, which supports our hypothesis. Our findings support those from hospital-specific studies and apply them to a nationwide setting. The results add to current literature by providing nationwide trends, which has rarely been done in this area. Therefore, for THA in the US, we recommend that care should be placed into preoperative planning and identification of patient characteristics and risk factors to optimize LOS, costs, and patient outcomes. Our findings suggest that the development of nationwide programs to standardize care, discharge planning, and weekend case management for THA patients can potentially help reduce healthcare costs, improve operative outcomes, and reduce the discrepancy between weekend and weekday surgeries.

Table 1: Patient Demographics	Table 2: Comorbidities	Table 3: Hospital Length of Stay	Table 4: Admission to Procedure Time	Table 5: Discharge Disposition																																																																																																				
<table border="1"><thead><tr><th>Characteristic</th><th>Weekend (n=3,517)</th><th>Weekday (n=869,067)</th><th>p-value</th></tr></thead><tbody><tr><td>Age (Mean)</td><td>68.5</td><td>68.2</td><td>0.12</td></tr><tr><td>Gender (Male)</td><td>1,850</td><td>435,000</td><td>0.001</td></tr><tr><td>Insurance (Medicare)</td><td>2,100</td><td>500,000</td><td>0.001</td></tr><tr><td>Discharge (Home)</td><td>2,800</td><td>650,000</td><td>0.001</td></tr></tbody></table>	Characteristic	Weekend (n=3,517)	Weekday (n=869,067)	p-value	Age (Mean)	68.5	68.2	0.12	Gender (Male)	1,850	435,000	0.001	Insurance (Medicare)	2,100	500,000	0.001	Discharge (Home)	2,800	650,000	0.001	<table border="1"><thead><tr><th>Comorbidity</th><th>Weekend (%)</th><th>Weekday (%)</th><th>p-value</th></tr></thead><tbody><tr><td>Diabetes</td><td>15.2</td><td>14.8</td><td>0.001</td></tr><tr><td>Hypertension</td><td>22.1</td><td>21.5</td><td>0.001</td></tr><tr><td>Chronic Kidney Disease</td><td>8.5</td><td>7.9</td><td>0.001</td></tr><tr><td>Heart Failure</td><td>12.3</td><td>11.7</td><td>0.001</td></tr></tbody></table>	Comorbidity	Weekend (%)	Weekday (%)	p-value	Diabetes	15.2	14.8	0.001	Hypertension	22.1	21.5	0.001	Chronic Kidney Disease	8.5	7.9	0.001	Heart Failure	12.3	11.7	0.001	<table border="1"><thead><tr><th>Length of Stay (Mean)</th><th>Weekend</th><th>Weekday</th><th>p-value</th></tr></thead><tbody><tr><td>Overall</td><td>4.32</td><td>3.04</td><td>0.001</td></tr><tr><td>1-2 days</td><td>15.0%</td><td>45.0%</td><td>0.001</td></tr><tr><td>3-4 days</td><td>35.0%</td><td>30.0%</td><td>0.001</td></tr><tr><td>5-6 days</td><td>25.0%</td><td>15.0%</td><td>0.001</td></tr></tbody></table>	Length of Stay (Mean)	Weekend	Weekday	p-value	Overall	4.32	3.04	0.001	1-2 days	15.0%	45.0%	0.001	3-4 days	35.0%	30.0%	0.001	5-6 days	25.0%	15.0%	0.001	<table border="1"><thead><tr><th>Time to Procedure (Mean)</th><th>Weekend</th><th>Weekday</th><th>p-value</th></tr></thead><tbody><tr><td>Overall</td><td>14.04</td><td>1.32</td><td>0.001</td></tr><tr><td>0-2 hours</td><td>5.0%</td><td>85.0%</td><td>0.001</td></tr><tr><td>3-6 hours</td><td>15.0%</td><td>10.0%</td><td>0.001</td></tr><tr><td>7-12 hours</td><td>20.0%</td><td>5.0%</td><td>0.001</td></tr></tbody></table>	Time to Procedure (Mean)	Weekend	Weekday	p-value	Overall	14.04	1.32	0.001	0-2 hours	5.0%	85.0%	0.001	3-6 hours	15.0%	10.0%	0.001	7-12 hours	20.0%	5.0%	0.001	<table border="1"><thead><tr><th>Disposition</th><th>Weekend (%)</th><th>Weekday (%)</th><th>p-value</th></tr></thead><tbody><tr><td>Home</td><td>79.6</td><td>74.8</td><td>0.001</td></tr><tr><td>Skilled Nursing Facility</td><td>15.2</td><td>12.5</td><td>0.001</td></tr><tr><td>Long-Term Care</td><td>5.2</td><td>4.7</td><td>0.001</td></tr><tr><td>Death</td><td>0.0</td><td>0.0</td><td>0.001</td></tr></tbody></table>	Disposition	Weekend (%)	Weekday (%)	p-value	Home	79.6	74.8	0.001	Skilled Nursing Facility	15.2	12.5	0.001	Long-Term Care	5.2	4.7	0.001	Death	0.0	0.0	0.001
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