

Elective Hand Surgery Is Delayed among Private Insurance Holders

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Objectives: Patients with private healthcare plans often defer nonemergent or elective procedures toward the end of the year once they have met their deductible. No previous studies have evaluated how insurance status and hospital setting may affect surgical timing for upper extremity procedures. Our study aimed to evaluate the influence of insurance and hospital setting on end-of-the-year surgical cases for elective carpometacarpal (CMC) arthroplasty, carpal tunnel, cubital tunnel, and trigger finger release, and nonelective distal radius fixation.

Methods: Insurance provider and surgical dates were gathered from two institutions' electronic medical records (one university, one physician-owned hospital) for those undergoing CMC arthroplasty, carpal tunnel release, cubital tunnel release, trigger finger release, and distal radius fixation from January 2010 to December 2019. Dates were converted into corresponding fiscal quarters (Q1–Q4). Using the Poisson exact test, comparisons were made between the case volume rate of Q1–Q3 and Q4 for private insurance and then for public insurance.

Results: Overall, case counts were greater in Q4 than the rest of the year at both institutions. There was a significantly greater proportion of privately insured patients undergoing hand and upper extremity surgery at the physician-owned hospital than the university center (physician owned: 69.7%, university: 50.3%; $P < 0.001$). Privately insured patients underwent CMC arthroplasty and carpal tunnel release at a significantly greater rate in Q4 compared with Q1–Q3 for both institutions. Publicly insured patients did not experience an increase in carpal tunnel releases during the same period at both institutions.

Conclusions: Privately insured patients underwent elective CMC arthroplasty and carpal tunnel release procedures in Q4 at a significantly greater rate than publicly insured patients. This finding suggests private insurance status, and potentially deductibles, influence surgical decision making and timing. Further work is needed to evaluate the impact of deductibles on surgical planning and the financial and medical impact of delaying elective surgeries.

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The authors did not report any financial relationships or conflicts of interest. Accepted July 19, 2022.

0038-4348/0-2000/116-270

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DOI: 10.14423/SMJ.0000000000001523

Key Words: hand surgery, hospital setting, insurance status, surgical timing, upper extremity

The insurance deductible is the set amount that patients are responsible for paying toward their medical care during the year; above this amount, the insurance often begins paying for a majority, or all, of the remaining costs.¹ The intent of the deductible is for patients to be responsible for funding the upfront cost of medical care, to incentivize judicious use of health care and curb overspending on health services. These out-of-pocket expenses, however, in addition to their monthly insurance payments, may have the unintended consequence of dissuading privately insured patients from undergoing timely elective surgical management.²

Public insurance, such as that provided by the government, often does not have these higher out-of-pocket costs. Although upfront cost to the patient may be lower, public insurance status has been demonstrated to impede timely access to care for patients with orthopedic pathology.^{3–6} Even though there may be some efficiency to private insurance plans, they are more likely than public insurance plans to require higher copays and deductibles.⁷ As elective surgeries are some of the most commonly delayed services by privately insured patients,² those with a high out-of-pocket cost may choose to schedule elective procedures toward the end of the year once their deductible has been met. This flood in surgical volume has been observed to affect orthopedic surgical practices more so than other surgical subspecialties.⁸

It is unclear what impact insurance status or procedure location (privately owned hospital vs university hospital) may have

Key Points

- Significantly more privately insured patients underwent elective upper extremity procedures in the fourth fiscal quarter than the rest of the year.
- Procedures for publicly insured patients did not differ throughout the year.
- These patterns were similarly observed in both private and academic settings.
- The physician-owned institution performed surgeries on privately insured patients at a significantly greater rate than the university hospital.

on elective orthopedic hand and upper extremity procedure timing. The purpose of this study was to evaluate the relation among insurance status, procedure location, and surgical timing for these elective hand and upper extremity procedures. We hypothesize that more elective procedures will be performed among privately insured patients than publicly insured patients in the fourth fiscal quarter (Q4) in both settings. In addition, we anticipate a greater proportion of privately insured patients undergoing operations in the physician-owned hospital setting.

Methods

Data Extraction

University of Alabama at Birmingham institutional review board approval was obtained in advance of data extraction and analysis. A retrospective review of institutional databases was performed, selecting patients who underwent the five most commonly performed hand and upper extremity surgical procedures in the databases. These included carpometacarpal (CMC) arthroplasty (Current Procedural Terminology codes 25447 and 26841), carpal tunnel release (64721 and 29848), cubital tunnel release (64718), open reduction internal distal radius fixation (DRF; 25607, 25608, and 25609), and trigger finger release (TFR; 26055) from January 2010 to December 2019 within the hospital systems of the principal investigators (A.M.M., A.J.C., E.W.B., and B.A.P.).

One institution is a private, physician-owned surgical setting and the other is a large university-based hospital setting. Total procedure volumes, surgical date, and patient insurance provider were gathered from the central electronic medical record surgical databases of the home institutions. CMC arthroplasty, carpal tunnel release, cubital tunnel release, and TFR procedures are indicated as elective procedures, whereas DRF was deemed nonelective. Given the time-sensitive nature of DRF management, this procedure was used as a contrast to the elective procedures.

Insurance Stratification

Insurance groups were stratified into two groups: public or private. The public group comprised primarily government payors or government insurance with a commercial administrator. These included Medicare, Medicaid, Medicare Health Maintenance Organization, Champus/TRICARE, Humana Public Education Employees' Health Insurance Plan, institutional Charity Care, Maternity Waiver, United Healthcare State Employees Insurance Board Public Education Employees' Health Insurance Plan, United Mine Workers, or Viva Medicare. All of the other insurance providers were categorized as private or commercial.

Data Analysis

Operative dates were converted into calendar quarters, whereby Q1 begins on January 1. The case frequencies were then compared within each insurance category between the first three quarters (January 1–September 30) and the fourth quarter (October 1–December 31).

Poisson exact tests were used to compare the rate of procedures in the fourth quarter (Q4) with the rest of the year (Q1–Q3) for each procedure. This analysis was carried out within (intraprivate/public) and between (interinsurance) insurance groupings. Analyses were performed using SPSS version 27.0 (IBM SPSS Statistics, Armonk, NY). Statistical significance was set to $P < 0.05$.

Results

During the 10-year sample period, we identified 13,314 patients who underwent hand and upper extremity surgeries. From this cohort, 6107 (45.9%) were from the university hospital and 7207 (54.1%) were from the physician-owned institution (Table 1). For each procedure, there were 725 (414 university, 311 physician owned) CMC arthroplasties, 5863 (2148 university, 3715 physician owned) carpal tunnel releases, 1316 (511 university, 805 physician owned) cubital tunnel releases, 2317 (1327 university, 990 physician owned) DRFs, and 3093 (1707 university, 1386 physician-owned) TFRs. Of these individuals, the physician-owned hospital had a significantly greater proportion of privately insured patients (4345; 70%) than the university hospital (2308; 48%; $P < 0.001$; Table 2).

Surgical Timing Comparisons

Significantly more privately insured patients underwent Q4 CMC arthroplasties (Q4: 33.3% vs Q1–Q3: 22.3%, $P \leq 0.001$) and carpal tunnel releases (Q4: 28.0% vs Q1–Q3 average: 24%, $P = 0.04$) than publicly insured patients (Table 1). Cubital tunnel release, DRG, and TFR saw no end-year increase in case rate in either insurance type.

Discussion

This retrospective review evaluated the timing of common orthopedic hand surgeries throughout the year based on both insurance status and medical setting. The most important finding from this study is that CMC arthroplasty and carpal tunnel release occurred at a significantly greater rate later in the year (Q4) among privately insured individuals, irrespective of medical setting. This trend was not noted for publicly insured patients, suggesting that insurance status and type may affect surgical timing and medical utilization decision making.

Insurance coverage status has been a somewhat contentious issue that has permeated the political landscape in the last several years. Public insurance, including Medicare and Medicaid, is meant to offload the financial stress of retirement, disability, and unemployment, through the lack of copay and deductibles and lower premiums. Studies have demonstrated that public insurance status can lead to decreased healthcare utilization and delays in seeking care, however.^{3,5} Some of this can be attributed to not being accepted by all practices and difficulty scheduling appointments.⁹ This is likely because of the lower overall reimbursement rates for certain public insurance plans, and the effect of this may therefore be seen to more greatly affect private practices than

Table 1. Procedure volumes from 2010–2019

| | CMC arthroplasty | | Carpal tunnel release | | Cubital tunnel release | | Distal radius fixation | | Trigger finger release | |
|-----------------|------------------|--------------------------|-----------------------|-------------------------|------------------------|-----------------|------------------------|-----------------|------------------------|------------------|
| | M (%) | P (%) | M (%) | P (%) | M (%) | P (%) | M (%) | P (%) | M (%) | P (%) |
| University | | | | | | | | | | |
| Q1 | 64 (27.6) | 44 (24.2) | 265 (24.4) | 246 (23.2) | 52 (20.7) | 53 (20.4) | 131 (23.2) | 173 (22.7) | 236 (26.1) | 198 (24.6) |
| Q2 | 70 (30.2) | 41 (22.5) | 286 (26.3) | 273 (25.7) | 64 (25.5) | 69 (26.5) | 158 (28.0) | 215 (28.2) | 203 (22.5) | 181 (22.5) |
| Q3 | 52 (22.4) | 36 (19.8) | 281 (25.9) | 246 (23.2) | 63 (25.1) | 72 (27.7) | 140 (24.8) | 187 (24.5) | 255 (28.2) | 187 (23.3) |
| Q4 | 46 (19.8) | 61 (33.5) | 254 (23.4) | 297 (28.0) | 72 (28.7) | 66 (25.4) | 135 (23.9) | 188 (24.6) | 209 (23.1) | 238 (29.6) |
| Physician owned | | | | | | | | | | |
| Q1 | 32 (27.1) | 48 (24.9) | 268 (25.2) | 576 (21.7) | 43 (20.4) | 113 (19.0) | 73 (23.4) | 138 (20.4) | 122 (25.5) | 171 (18.9) |
| Q2 | 29 (24.6) | 29 (15.0) | 279 (26.2) | 667 (25.2) | 54 (25.6) | 144 (24.2) | 91 (29.2) | 205 (30.2) | 128 (26.7) | 247 (27.2) |
| Q3 | 21 (17.8) | 52 (26.9) | 269 (25.3) | 667 (25.2) | 55 (26.1) | 170 (28.6) | 70 (22.4) | 173 (25.5) | 118 (24.6) | 247 (27.2) |
| Q4 | 36 (30.5) | 64 (33.2) | 248 (23.3) | 741 (28.0) | 59 (28.0) | 167 (28.1) | 78 (25.0) | 162 (23.9) | 111 (23.2) | 242 (26.7) |
| | <i>P</i> = 0.76 | <i>P</i> = 0.0075 | <i>P</i> = 0.096 | <i>P</i> = 0.042 | <i>P</i> = 0.055 | <i>P</i> = 0.37 | <i>P</i> = 0.69 | <i>P</i> = 0.96 | <i>P</i> = 0.95 | <i>P</i> = 0.098 |

CMC, carpometacarpal; M, public insurance; P, private insurance. Q, quarter; H_o , public insurance rate proportion at university institution = public insurance case rate proportion at physician-owned institution. H_a , public insurance case rate proportion at university institution \neq public insurance case rate proportion at physician-owned institution. H_o : Q4 rate = Q1–Q3 rate. H_a : Q4 rate > Q1–Q3 rate.

public institutions.¹⁰ This is exemplified in our study by the significant difference in insurance distribution between institutions, with nearly half (49.7%) of the university patients being publicly insured, as opposed to one-third (30.3%) at the physician-owned hospital.

Although private insurance can have expanded access to providers compared with public insurance, the higher copays and deductibles often increase the out-of-pocket costs faced by patients for their medical care. The insurance deductible is the annual amount patients must contribute to their care before insurance begins paying for a majority or all of the remaining medical care. Even though its purpose is for patients to share in the burden of financing their health care up to a certain threshold to incentivize appropriate health utilization, the average annual deductible has continued to rise during the last several years.^{11,12} Because deductibles reset at the start of every year, patients are incentivized to wait until their deductible is met before proceeding with an operation because the additional cost they are responsible for is much smaller than if they had undergone the procedure before their deductible had been met.¹³

Our data demonstrated that cases increased overall in Q4 at both institutions, relative to the average of the previous three quarters (Table 3). This is consistent with previous literature that observed significantly greater nonemergent procedures during December as compared with the rest of the year.^{8,14} When stratifying

Table 2. Interinstitution procedure volume comparison ($P \leq 0.001$)

| | M (%) | P (%) | Total |
|-----------------|-----------|-----------|-------|
| University | 2472 (52) | 2308 (48) | 4780 |
| Physician owned | 1872 (30) | 4345 (70) | 6217 |

M, public insurance; P, private insurance.

by insurance status, our investigation showed that privately insured patients underwent significantly more elective procedures (CMC arthroplasty and carpal tunnel release) during this time. This could be explained by the findings by Shukla et al of a strengthened seasonal association with outpatient orthopedic procedures that paralleled the yearly increases in insurance deductibles.⁸ Higher out-of-pocket costs and deductibles have been demonstrated to directly affect surgical timing and cost-related delays in care for other specialties, so the pattern found in elective orthopedic procedures would be a logical extension.^{15,16}

If yearly deductibles continue to rise, the concentration of year-end procedures may likely expand. The increase in procedure rates places increased administrative strain on surgeons, and has been reported to require additional resources, such as hiring temporary help, more operative time, and more work for house staff.¹⁷ These problems are further complicated by the increased frequency of federal holidays in the fourth quarter. This inevitably decreases available operating time, patient interaction,

Table 3. Overall procedure volumes from 2010–2019

| | M | P | Total |
|-----------------|--------------|------------------|------------------|
| University (%) | | | |
| Q1–Q3 (%) | 1891 (76.5) | 1646 (71.3) | 3537 (74.0) |
| Q4 (%) | 581 (23.5) | 662 (28.7) | 1243 (26.0) |
| Total | 2472 | 2308 | 4780 |
| Physician owned | | | |
| Q1–Q3 (%) | 1418 (75.7) | 3131 (72.1) | 4549 (73.2) |
| Q4 (%) | 454 (24.3) | 1214 (27.9) | 1668 (26.8) |
| Total | 1872 | 4345 | 6217 |
| <i>P</i> value | 0.074 | <0.001 | <0.001 |

H_o : Q4 rate = Q1–Q3 rate. H_a : Q4 rate > Q1–Q3 rate. Q, quarter.

and work–life balance.¹⁸ Inadequate time with patients, whether in the operating room or clinic, can result in increased medical errors and miscommunication between patients and physicians.¹⁹

Although this investigation is the first of its kind evaluating surgical timing and elective hand surgery, it is not without limitations. The retrospective nature of this study precludes causative analysis of insurance status and surgical timing. In addition, surgeon and patient reasoning, and motives for surgery at a certain time point were not directly evaluated. Confounders aside, correlational inferences regarding deductibles as a decision driver are supported by the abundance of literature in other fields.^{13,15,16}

Furthermore, there are a multitude of factors affecting surgical timing. Seasonality of the pathological processes also may contribute to differences observed. Seasonal differences should affect publicly and privately insured individuals equally, however. Because of the nature of the data, we were unable to compare actual deductible costs or disease severity or duration, which may affect the surgical decision.

Conclusions

In this study we demonstrated that more orthopedic hand and upper extremity surgeries were performed on average in the fourth quarter. Furthermore, there were significantly more elective procedures for privately but not publicly insured patients at the end of the year. This increase suggests that insurance status, and potentially insurance deductibles, may influence time to operation. Future work should investigate the direct impact that insurance deductibles have on surgical timing for elective orthopedic procedures.

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