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Abstract No. 233

Practice patterns in the United States for ablation of osseous tumors using Medicare claims analysis

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Purpose: To describe national practice trends in bone radio-frequency ablation (RFA) and cryoablation for osseous lesions by physician specialty and site-of-service from 2015 to 2018.

Materials and Methods: This study used data from the US Centers for Medicare and Medicaid Services public use files for 2015 to 2018. Current Procedural Terminology (CPT) codes for bone RFA (20982) and cryoablation (20983) were analyzed. Based on the specialty code, the specialty was sorted into five categories: radiology (diagnostic and interventional), orthopedic surgery, neurosurgery, pain management (pain management, anesthesiology, physical medicine and rehabilitation, and interventional pain management), and all others. Annual volume of billed services was additionally evaluated by site of service (inpatient, outpatient, office-based).

Results: Aggregate claims dramatically increased from 2015 to 2018. The enrollment adjusted overall growth averaged 45.2% year-over-year, strongly driven by growth in RFA. Annual market share for radiology decreased slightly from 80.6% to 73.3% with neurosurgery making the largest gain, increasing from 4.7% to 11.3% from 2015 to 2018. Clinical site-of-service analysis demonstrated that outpatient is the main site-of-service for ablation (62.7% cumulatively from 2015 to 2018). Growth rates of outpatient and inpatient services are about the same over this time.

Conclusions: There has been significant growth in osseous ablation between 2015 and 2018, with the growth dominated by radiology, although the overall growth rate and the market share of radiology are declining as the growth is outstripped by neurosurgery and orthopedics. Further consideration of these trends will be important for interventional radiologists to assure their involvement and expertise in ablation procedures.

Abstract No. 234

Interventional radiology case mix changes due to the COVID-19 pandemic

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Average Weekly Procedural Volume Stratified by Procedure Type and Patient Service Location During the Pre-surge (Weeks 1-9), Surge (weeks 10-19), and Recovery (Weeks 20-33) Periods of 2020

| Overall | Pre-surge (Weeks 1-9) | Surge (Weeks 10-19) | Recovery (Weeks 20-33) |
|---------|-----------------------|---------------------|------------------------|
| Biopsy  | 15.2                  | 8.5                 | 13.4                   |
| Drainage| 46.3                  | 29.9                | 44.5                   |
| Enteric | 6.6                   | 5.8                 | 6.5                    |
| Access  |                       |                     |                        |
| Venous  | 36.8                  | 31.6                | 33.2                   |
| Access  |                       |                     |                        |
| Neuro   | 38.1                  | 22.4                | 35.9                   |
| Oncology| 16.8                  | 9.5                 | 15.1                   |
| Vascular| 56.3                  | 27.1                | 48.2                   |
| Other   | 5.6                   | 2.4                 | 4.6                    |
| Inpatient |                      |                     |                        |
| Biopsy  | 4.6                   | 1.7                 | 5.4                    |
| Drainage| 24.4                  | 16.6                | 24.7                   |
| Enteric | 3.9                   | 4.5                 | 4.3                    |
| Access  |                       |                     |                        |
| Venous  | 16.0                  | 17.0                | 12.1                   |
| Access  |                       |                     |                        |
| Neuro   | 9.7                   | 6.8                 | 7.6                    |
| Oncology| 3.8                   | 2.6                 | 5.4                    |
| Vascular| 28.2                  | 14.1                | 24.1                   |
| Other   | 1.4                   | 0.6                 | 2.0                    |
| Outpatient |                     |                     |                        |
| Biopsy  | 10.7                  | 6.8                 | 8.1                    |
| Drainage| 20.0                  | 10.8                | 18.1                   |
| Enteric | 0.9                   | 0.5                 | 0.6                    |
| Access  |                       |                     |                        |
| Venous  | 20.4                  | 14.4                | 20.9                   |
| Access  |                       |                     |                        |
| Neuro   | 25.1                  | 11.7                | 25.6                   |
| Oncology| 12.3                  | 6.5                 | 9.4                    |
| Vascular| 27.7                  | 12.5                | 23.5                   |
| Other   | 4.1                   | 1.6                 | 2.6                    |
Purpose: The COVID-19 pandemic led to unprecedented radiology volume loss and substantial changes in case mix. This study seeks to identify the specific sources of procedural volume loss and recovery in a large academic system at the epicenter of the pandemic. Materials and Methods: All procedures performed during the first 33 weeks of 2020 in the Department of Radiology of a large academic health system were reviewed retrospectively. Data included modality, billed current procedural terminology (CPT) codes, and patient service location. Each procedure was assigned to 1 of 8 categories: biopsy, drainage, enteric access, venous access, neuro (both spinal and cerebral), oncology, vascular (both arterial and venous), and other. For analysis of the effects of COVID-19, volumes were aggregated weekly and a “surge” period was defined beginning with the first local COVID-19 positive patient and ending when new daily cases crossed below 25% of the peak. Results: There were significant decreases in all categories during the surge period. The largest declines were seen in vascular (-52%), biopsy (-44%), and oncology (-43%) procedures and the smallest in venous (-14%) and enteric (-12%) access. When stratified by site of service, there were relative increases over baseline in inpatient oncology (+44%), biopsy (+18%), and enteric access (+10%) procedures following the surge. Conclusions: During the local COVID-19 outbreak, procedural volume loss was offset by increasing the department’s role in providing venous and enteric access. The relative increase in inpatient interventional oncology and biopsies during the recovery is likely multifactorial but may support prior assertions that delayed diagnosis and treatment due to the pandemic has resulted in more severe disease at presentation.

Abstract No. 235

Trends of utilization of preoperative embolization for spinal metastases

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Purpose: While previous studies suggest that preoperative embolization (PE) of hypervascular spinal metastases may alleviate intraoperative blood loss and improve resectability, trends and driving factors for choosing this approach have not been extensively explored. Therefore, we evaluated the trends and assessed the factors associated with PE utilization for spinal metastatic tumors using a national inpatient database. Materials and Methods: Nationwide Inpatient Sample (NIS) database of the Healthcare Cost and Utilization Project (HCUP) was queried for patients undergoing surgical resection for spinal metastasis between January 1, 2005, and December 31, 2017. Patients undergoing PE were identified; trends in the utilization of PE were analyzed using Cochran-Armitage Test. Multivariable regression was conducted to assess factors associated with higher PE utilization.

Characteristics Associated with Patients Undergoing Preoperative Embolization

|                | Odds Ratio | P Value | Lower 95% CI | Upper 95% CI |
|----------------|------------|---------|--------------|--------------|
| Age            | 0.985      | 0.11    | 0.967        | 1.003        |
| Female         | 0.801      | 0.383   | 0.487        | 1.318        |
| Year           | 1.263      | <0.001  | 1.175        | 1.358        |
| Race           |            |         |              |              |
| White          | Base       |         |              |              |
| African American or Black | 0.961 | 0.925 | 0.423 | 2.184 |
| Hispanic       | 1.100      | 0.807   | 0.512        | 2.363        |
| Other          | 1.966      | 0.016   | 1.136        | 3.403        |
| Primary Tumor  |            |         |              |              |
| Renal          | Base       |         |              |              |
| Colorectal     | 0.079      | <0.001  | 0.035        | 0.175        |
| Liver          | 0.079      | <0.001  | 0.025        | 0.256        |
| Breast         | 0.187      | 0.002   | 0.066        | 0.527        |
| Prostate       | 0.043      | <0.001  | 0.020        | 0.095        |
| Lung           | 0.017      | <0.001  | 0.004        | 0.072        |
| Median Household Income Quartile |       |         |              |              |
| 0-25th percentile | Base |         |              |              |
| 26-50th percentile | 1.300 | 0.431 | 0.677 | 2.497 |
| 51st-75th percentile | 1.727 | 0.085 | 0.927 | 3.217 |
| 76th-100th percentile | 1.546 | 0.184 | 0.813 | 2.941 |
| Elixhauser Comorbidities |       |         |              |              |
| Psychoses      | 4.448      | 0.023   | 1.231        | 16.074       |
| Cardiac arrhythmias | 1.795 | 0.022 | 1.089 | 2.959 |
| Renal failure  | 0.794      | 0.482   | 0.418        | 1.510        |

Results: A total of 11,508 patients with spinal metastasis were identified; 105 (0.91%) underwent PE. Of the 105 patients, 79 (75.2%) patients had a primary renal cancer as compared to 1,732 (15.19%) for those who did not undergo PE (P < 0.001). The majority of patients in the non-PE cohort had a primary lung tumor (n = 3,562, 31.24%). Additionally, patient comorbidities were similar among the two groups (P > 0.05). Trends in PE indicated an increase of 0.16% (std error: 0.024%, P < 0.001) in utilization per year.

Conclusions: Utilization of PE for spinal metastasis is increasing yearly, especially for patients with renal cancer, suggesting that surgeons may increasingly consider embolization before surgical resection for hypervascular tumors. Additionally, the literature has shown the intraoperative and postoperative benefits of this procedure.

Abstract No. 236

Comparison of 30-day readmission rate and mortality risk using a controlled expansion endoprosthesis or a conventional covered endoprosthesis: a single-center, retrospective study

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