

POSTER 70

Title: Determining pain and functional outcomes for percutaneous stabilization of metastatic pelvic lesions via photodynamic nails

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Introduction

Metastatic bone disease of purely lytic or mixed blastic-lytic composition may cause local destruction of cortical and trabecular bone. This destruction leads to both significant pain and increases the risk of pathologic fracture. Because of mechanical and oncologic pain, this patient population often experiences very limited function and mobility. Although often treated conservatively using external radiation or percutaneous ablation, many of these patients require gross surgical resection and megaprosthesis. Contrasting with these procedures on the extremities, there are currently minimal options of small incision pelvic implants such percutaneous screws or Steinman pin plus or minus cementation. The IlluminOss™ photodynamic bone stabilization system (PBSS) is a non-rigid polymer that allows for customizable adhesion to the bone. We retrospectively collected data with the goal of effectively evaluating patient reported outcomes of those who receive PBSS.

Objective

The aim of our study was to quantify the effect in pain reduction and improvement in functional scores in patients with metastatic bone disease of the pelvis at risk of fracture treated with photodynamic nails

Methodology

A retrospective cohort analysis was conducted on 35 patients who underwent PBSS for management of metastatic pelvic cancer from October 2020 through October 2021 at a single academic medical center. Seven patients failed to meet inclusion criteria. Demographic data was abstracted from medical charts, and PROMIS Global Physical scores were collected from patient reported surveys at specific timepoints,

i.e. pre-operative, two days, two weeks, and six weeks postoperative. Not every patient was able to complete surveys at each individual time point due to loss to follow up and three patient deaths. Pain was rated using the Numerical Rating Score (NRS) from 0 to 10. We examined the relationship between average preoperative and postoperative NRS and PROMIS data. Additionally, we used Pearson correlation coefficients to determine the relationship between PROMIS and NRS scores.

Results

Average age of the total cohort was 71 years [Range 25 years, SD 7.31 years] (n = 31). The most common primary cancer diagnoses were multiple myeloma (22.6%), lung (19.4%), and breast (16.1%). Most patients were female (48.4% male vs 51.6% female). Average BMI was 26.68 kg/m² (range 27.76), while mean age-adjusted Charlson comorbidity index (CCI) was 10.35 [range 13, SD 2.27]. Average preoperative pain level as rated by the Numerical Rating Score (NRS) from 0 to 10 was of 6.39 [range 10, SD 2.04] while preoperative PROMIS was 35.92 [range 27.4, SD 6.80]. Average postoperative pain level was 3.61 [range 10, SD 3.06] while postoperative PROMIS was 38.43 [range 34.2, SD 9.37]. Average improvement in pain at 2 weeks and 6 weeks was 3.50 (SD 2.71) and 4.4 (SD 2.26) ($p = 2.29 \times 10^{-7}$, $p = 6.73 \times 10^{-10}$). Preoperatively, 51.6% of patients were using narcotic pain medication. At 6 weeks status post PBSS, 32.2% of patients were reported taking narcotic pain medication. As expected, negative correlations were examined between preoperative PROMIS and NRS scores (-0.34), as well as postoperative scores (-0.73) for n = 5. Complications were limited to two episodes of wound dehiscence that were treated surgically with complete resolution. In the case of three patients with subsequent surgical procedures, the IlluminOss pelvic implant contributed to their stable conditions, allowing for revision with complex hip replacement and continued chemotherapy treatment.

Conclusion

Overall, preliminary data supports that PROMIS global physical health is a predictor of pain outcomes in metastatic pelvic cancer patients. Sample size was limited due to survey omission at follow up visits. Future research would focus on expansion of the patient cohort. Our current research efforts are focusing on prospective collection of PROMIS data in patients who have received photodynamic bone stabilization for metastatic pelvic cancer. Photodynamic bone stabilization is a safe and effective tool to reduce pain and improve function in patients with metastatic disease of the pelvis.