

Prophylactic fixation versus stabilization after completed fracture for metastatic disease: Patient reported outcomes over short term follow-up

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Introduction

Metastatic bone disease is an increasingly common sequela of cancer as the population ages. As people are living longer with cancer, the disease can spread further and go to the skeleton. Bone pain can be debilitating for these patients with a huge impact on quality of life (QOL).¹ This study looks at improvements in QOL in patients after orthopedic intervention for metastatic bone disease, either prophylactic fixation for impending fracture versus fixation for completed pathologic fracture. The hypothesis was that patients would have greater improvement after the procedure if they underwent prophylactic fixation versus following a completed fracture.

Methods

An institutional database of 208 patients who underwent surgical intervention for metastatic disease and completed Short Form-36 (SF-36) scores at baseline, 3 months, and 6 months was queried for patients who underwent lower extremity surgery. 145 patients were analyzed. (Table 1). To look at the effect of fracture type on the change in SF-36 values over time, we applied a repeated measures linear model with a random intercept, accounting for repeated measures to each patient at multiple time points.

Results

| | Overall, N = 145 | Fracture, N = 51 | Impending, N = 94 |
|--------------------------|------------------|------------------|-------------------|
| Gender | | | |
| Female | 92 (63%) | 30 (59%) | 62 (66%) |
| Male | 53 (37%) | 21 (41%) | 32 (34%) |
| Race | | | |
| Asian | 9 (6.4%) | 2 (4.1%) | 7 (7.6%) |
| Black | 7 (5.0%) | 1 (2.0%) | 6 (6.5%) |
| White | 125 (89%) | 46 (94%) | 79 (86%) |
| Unknown | 4 | 2 | 2 |
| Age at surgery | 64 (56, 70) | 66 (58, 72) | 62 (55, 68) |
| Primary diagnosis | | | |
| Bladder | 4 (2.8%) | 2 (3.9%) | 2 (2.1%) |
| Breast | 33 (23%) | 17 (33%) | 16 (17%) |
| Colorectal | 4 (2.8%) | 0 (0%) | 4 (4.3%) |
| Liver | 2 (1.4%) | 0 (0%) | 2 (2.1%) |
| Lung | 34 (23%) | 10 (20%) | 24 (26%) |
| Melanoma | 5 (3.4%) | 2 (3.9%) | 3 (3.2%) |
| Myeloma | 5 (3.4%) | 3 (5.9%) | 2 (2.1%) |
| Nasopharyngeal | 2 (1.4%) | 0 (0%) | 2 (2.1%) |
| Other | 19 (13%) | 6 (12%) | 13 (14%) |
| Prostate | 7 (4.8%) | 3 (5.9%) | 4 (4.3%) |
| Renal | 27 (19%) | 7 (14%) | 20 (21%) |
| Thyroid | 3 (2.1%) | 1 (2.0%) | 2 (2.1%) |
| Procedure | | | |
| Endoprosthesis | 101 (70%) | 37 (73%) | 64 (68%) |
| ORIF | 44 (30%) | 14 (27%) | 30 (32%) |

Statistics presented: n (%); median (IQR)

Table 1: Baseline demographics of patients studied

| Characteristic | Overall, N = 145 | Fracture, N = 51 | Impending, N = 94 |
|----------------|------------------|------------------|-------------------|
| PCS (baseline) | 22 (17, 31) | 22 (16, 29) | 23 (18, 31) |
| PCS 3 mo | 30 (20, 39) | 33 (21, 40) | 27 (19, 38) |
| PCS 6 mo | 31 (23, 40) | 34 (23, 41) | 29 (23, 37) |
| MCS (baseline) | 47 (36, 55) | 45 (34, 50) | 48 (37, 56) |
| MCS 3 mo | 49 (43, 57) | 51 (44, 56) | 49 (43, 57) |
| MCS 6 mo | 53 (47, 58) | 53 (47, 58) | 52 (47, 58) |

Table 2: SF-36 scores at baseline, 3 months, and 6 months divided into physical composite score (PCS) and mental composite score (MCS)

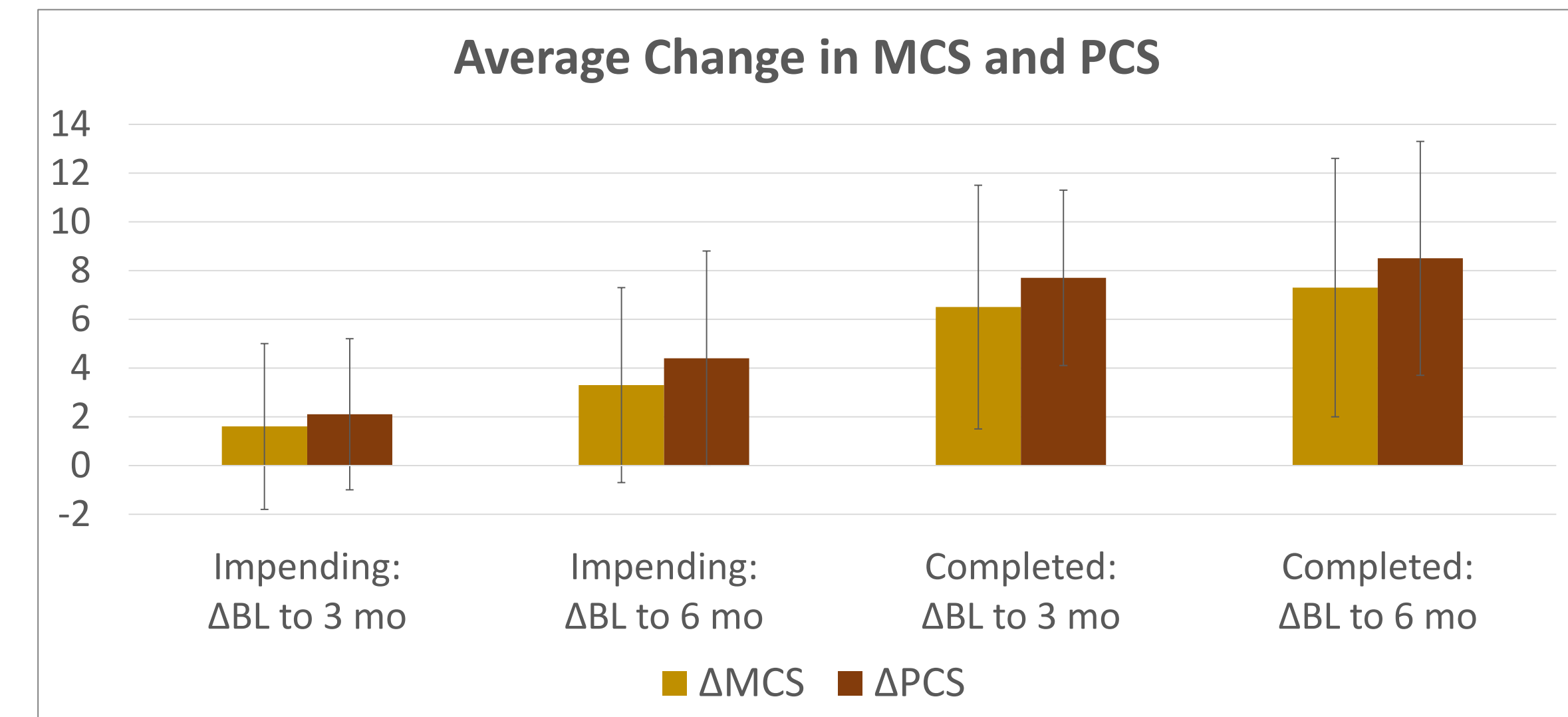


Chart 1: Average change in MCS and PCS scores (ΔMCS and ΔPCS) between baseline and 3 mo and baseline and 6 mo. Error bars are 95% CI.

- Baseline characteristics of both groups were similar, including gender, race, and age.
- Distribution of surgeries were similar – 2/3 endoprosthesis, 1/3 ORIF in each group.
 - Some pathologies demonstrated more prophylactic fixation when compared to intervention after completed fracture including colorectal, lung, and renal. (Table 1)
- Baseline patient reported outcomes [physical composite score (PCS) and mental composite score (MCS)] were similar, with improvements in both groups (Table 2). The completed group tended to improve more than the impending group (Chart 1).
- Average change in MCS at 3 mo and 6 mo for impending fractures compared to completed fractures was -4.8 points (95% CI -10.8, 1.2) and -4.0 points (95% CI -10.7, 2.7) at 6 mo respectively. The difference in change of MCS between groups was not statistically significant (p = 0.23).
 - The average difference of PCS between was 5.6 (95% CI -10.9, -0.2) at 3 mo and 4.1 (95% CI -10.1, 1.9) at 6 mo, with greater improvements seen in the completed fracture group, though the difference was also not statistically significant (p = 0.10).

Conclusions

Prophylactic fixation for impending pathologic fractures tends to be preferred due to lower hospital costs as well as lower morbidity.² Consequently, it may be perceived as a “missed opportunity” to intervene once a patient goes onto completed fracture. However, in this cohort of 145 patients who underwent ORIF and endoprostheses for completed and impending fractures, we observed that patients with completed fractures had comparable or even possibly improved patient reported outcomes. Given that no intervention is without risk of complications, this study establishes that improved patient reported outcomes can be seen even after completed fracture.