Objectives:
While upfront surgical decompression is the gold standard for malignant epidural spinal cord compression (MESCC) from solid tumor metastases, not all patients are surgical candidates or undergo successful surgical Bilsky downgrading. We report oncologic and functional outcomes for patients treated with SBRT to high-grade MESCC.

Methods:
Patients with Bilsky grade 2–3 MESCC from solid tumor metastases treated with SBRT from 2009 - 2020 were retrospectively reviewed. Patients who received upfront surgery were eligible but included only if post-surgical Bilsky grade remained >2. Neurologic exams, MRI imaging, pain assessments, and oral morphine equivalent (OME) opioid usage were assessed every 3–4 months in follow up. Pain response was defined as complete (pain level 0 on Visual Analog Scale), partial (pain level decrease >2 and at least stable OME; or stable pain level and >25% OME decrease), stable (same pain level and OME), or worse (higher pain level). Cumulative incidence of local recurrence (LR) was reported with death as a competing event, and overall survival (OS) was estimated with Kaplan-Meier.

Results:
We included 143 patients with median age of 56 years (range: 14-94). The most common histologies were NSCLC (17.4%), breast (16.7%), prostate (11.1%) and sarcoma (11.1%). The majority (75.5%) of metastases were in the T-spine, 22.3% in the C-spine, and 2.1% in the L-spine. Bilsky grade 2 represented 90.9% of cases. The median prescription dose was 25 Gy (range: 12-40) in a median of 5 fractions (range: 1-5). The median prescription isodose line was 60% (range: 50-85). One-fifth (20.3%) of cases were in the re-irradiation setting. The median follow up was 8.0 months (range: 0.4-116.9). At first post-SBRT follow-up imaging, 53.8% patients with Bilsky grade 2 were stable while 16.2% improved to a grade 1. Five of 13 patients (38.4%) with Bilsky grade 3 improved to grade 1-2. The cumulative incidence of LR was 5.1%, 7.5%, and 14.1% at 6, 12 and 24 months respectively. Of the 18 crude LRs occurring at a median of 9.7 months (range: 0.4-43.7), the most common histologies were RCC (4), NSCLC (3), sarcoma (2) and uterine (2). Only 6.3% of patients underwent salvage surgery, at a median of 11.1 months after SBRT (range: 2.0-16.7). Median OS was 10.7 months, and OS was 47.2% and 32.5% at 1 year and 2 years. Pain response in reference to pre-SBRT was complete in 45.4% and 55.7%, partial in 26.9% and 13.1%, stable in 24.1% and 27.9%, and worse in 3.7% and 3.3% of patients at 3 and 6 months respectively. At 3 months post-SBRT, 62.7% of evaluable patients ambulated with no assistance, compared to 48.3% of the same cohort pre-SBRT. No patients developed spinal cord myelopathy.

Conclusion(s):
We report the largest series to date of patients with high-grade MESCC treated with SBRT. The excellent local control and functional outcomes suggest SBRT is a reasonable approach in inoperable patients or cases unable to be successfully surgically downgraded.