Safety and Efficacy of Surgical Implantation of Intrathecal Drug Delivery Pumps in Cancer Patients with Refractory Pain

Graham Winston,[1] Jeffrey H. Zimering,[1] Christopher W. Newman,[1] Noel Manalil,[1] Amitabh Gulati,[2] Neal Rakesh,[2] Ilya Laufer,[1] Mark H. Bilsky,[1] & Ori Barzilai[1]

1. Department of Neurological Surgery; 2. Department of Anesthesia and Critical Care
Memorial Sloan Kettering Cancer Center, New York, NY

Memorial Sloan Kettering Cancer Center

Background:

Pain management in cancer patients is a critical issue, as clinicians aim to enhance quality of life and mitigate suffering. Most cancer patients experience cancer-related pain, and 30-40% of patients experience intractable pain despite maximal medical therapy. Intrathecal pain pumps (ITPs) have emerged as an option for achieving pain control in cancer patients.

Methods:

We retrospectively reviewed medical records of all adult cancer patients who underwent ITP placement at a tertiary comprehensive cancer center between 2013 and 2021.

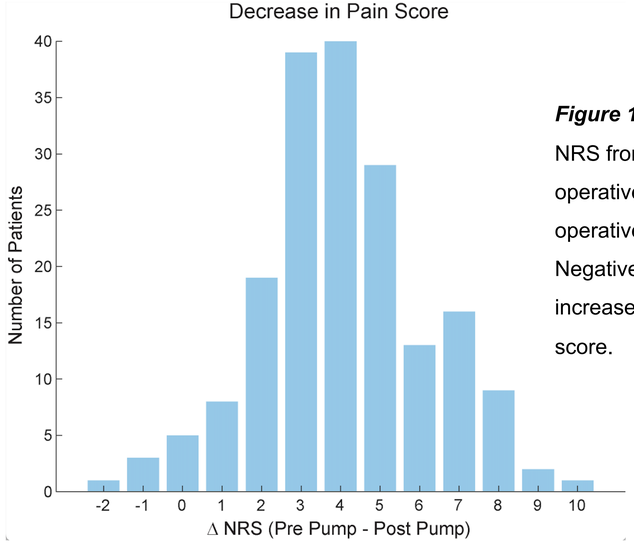

Figure 1. Decrease in NRS from Pre-operative to Post-operative Visit. Negative values reflect increases in pain score.

Results:

We found that the average numerical rating scale (NRS) score decreased significantly by 4.08 points (***Figure 1***, SD = 2.13, $p < 0.01$), from an average NRS of 7.38 (SD = 1.64) to an average NRS of 3.27 (SD = 1.66). Of 185 patients with pre-operative and follow-up NRS pain scores, all but nine experienced a decrease in NRS (95.1%). When categorized into mild (NRS ≤ 4), moderate (NRS 5-6), and severe (NRS ≥ 7) pain, 90.3% experienced decrease in category by at least one (***Figure 2***). Median overall survival from time of pump placement was 3.62 months (***Figure 3***, 95% CI: 2.73-4.54). A total of 42 adverse events in 33 patients were reported during the study period. The one-year cumulative incidence of any complication was 15.6% (95% CI: 10.9%-21.1%) and for severe complication was 5.7% (95% CI: 3.0%-9.7%). Eleven patients required re-operation during the study period, with a one-year cumulative incidence of 4.2% (95% CI: 2.0%-7.7%).

Conclusion:

Our study demonstrates that ITP implantation for the treatment of cancer-related pain is a safe and effective method of pain palliation with a low complication rate. The average overall survival after pump placement of approximately three months may be reflective of delayed referral for ITP placement evaluation.

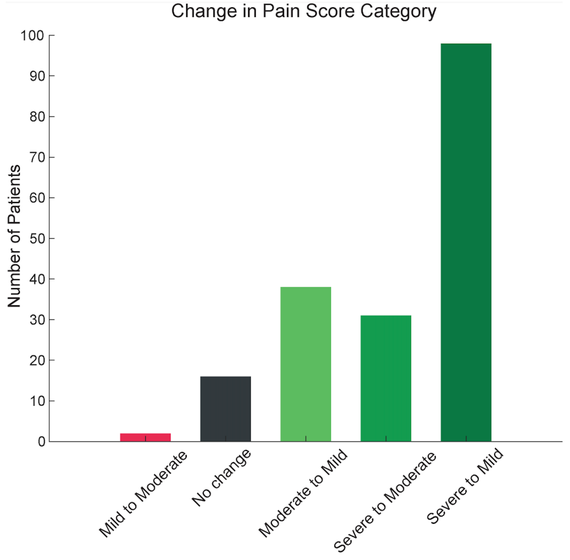

Figure 2. Change in Pain Score Category from Pre-operative to Post-operative Visit.

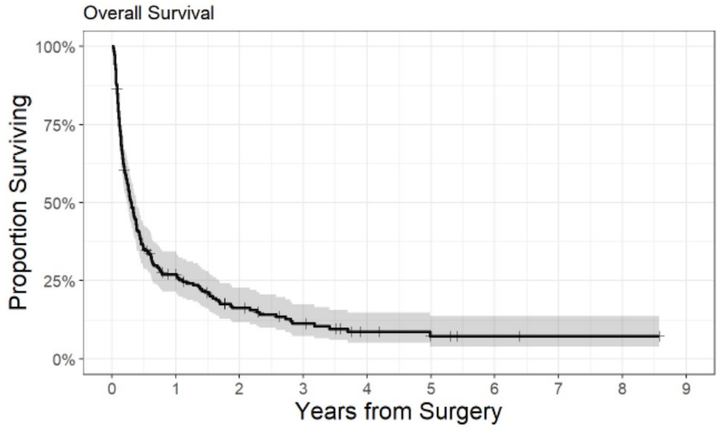

Figure 3. Overall Survival for Patient Cohort.