

National Trends in the Use of Peripheral Nerve Block in Outpatient Breast Cancer Procedures

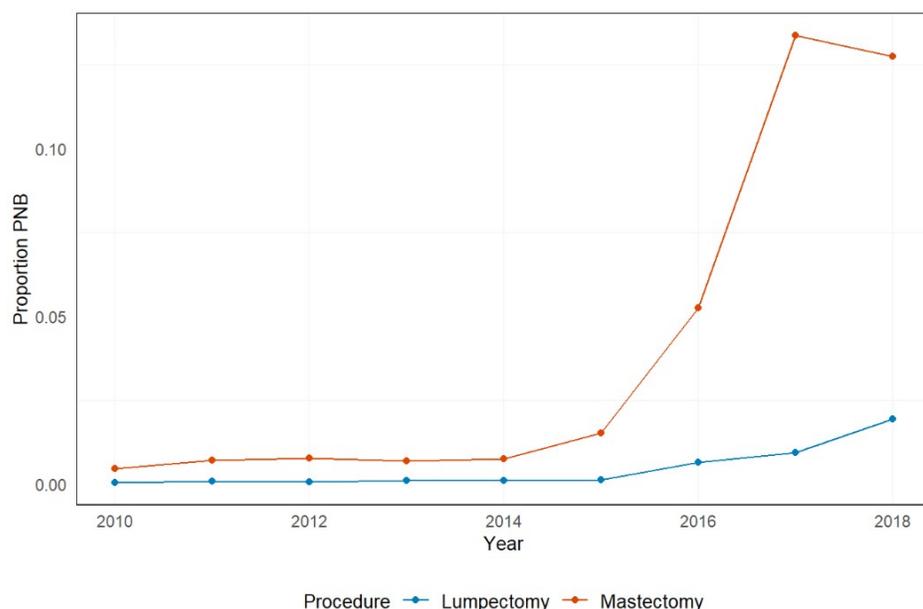
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Background: Compared to general anesthesia, regional anesthesia confers several benefits including improved pain control, earlier bowel recovery, decreased postoperative opioid consumption, earlier ambulation, and decreased risk of metastasis. While there is a growing body of knowledge on the benefits of peripheral nerve blocks (PNB), there is little epidemiological data on trends of its usage in oncological surgery. The goal of our study is to assess trends in the annual proportion of PNB use in outpatient breast cancer surgery from 2010 to 2018. We will also identify factors associated with PNB use for outpatient breast cancer surgery.

Methods: This study utilizes data from the Anesthesia Quality Institute National Anesthesia Clinical Outcomes Registry (AQI NACOR). Mastectomy and lumpectomy were analyzed separately due to fundamental differences in procedure invasiveness. We performed a Cochran-Armitage trend test to assess trends in the annual proportion of PNB use in outpatient lumpectomy and mastectomy from 2010 to 2018. Using mixed-effect logistic regression, we calculated odds ratio (OR), 95% confidence interval (CI), and *P* value, with *P* value threshold for significance set at $P \leq 0.001$ due to the large sample size of this study. To identify potential factors associated with PNB utilization in mastectomy, we generated univariable (UVA) models for all variables of interest: age, sex, ASA PS, facility type, facility region, day of procedure on a workday or a weekend/holiday, and tissue expander use. Using the results from the UVA models, we built a multivariable (MVA) model stratified by years 2010 to 2013 and years 2014 to 2018.

Results: Of the 336,618 mastectomy and lumpectomy cases from 2010 to 2018, 189,854 cases had complete data for age, sex, ASA PS, facility type, facility region, tissue expander use, year of procedure, and PNB use. For both mastectomy and lumpectomy cohorts, there was a significant increase in PNB proportion over time. Lumpectomy PNB proportion was <0.1% in 2014 and increased in each subsequent year to 1.9% in 2018. The mastectomy cohort showed similar trends, with a PNB proportion of 0.7% in 2014 increasing to 13% in 2018 (Figure 1). Prior to 2014, the OR for PNB use in mastectomy was 0.87 (95% CI 0.71–1.07; $P = 0.2$), suggesting little change through time in odds of receiving a PNB. After 2014, the odds of receiving PNB for mastectomy was 2.24 for every subsequent year (95% CI 2.00–2.49; $P < 0.001$). In addition, the following variables (other than year of procedure) were associated with



PNB use in the UVA model for the mastectomy cohort: age (OR 0.98; 95% CI 0.97–0.99; $P < 0.001$), sex (OR 0.31; 95% CI 0.17–0.57; $P < 0.001$), ASA PS (OR 0.71; 95% CI 0.62–0.83; $P < 0.001$), facility region ($P < 0.001$), and tissue expander use (OR 17.5; 95% CI 11.8–25.8; $P < 0.001$). In the MVA model stratified by years 2010 to 2013 and years 2014 to 2018, there were no factors associated with PNB use from 2010 to 2013. However, sex (OR 0.32; 95% CI 0.16–0.65; $P = 0.001$), facility region ($P < 0.001$), and tissue expander use (OR 52.9; 95% CI 29.4–95.2; $P < 0.001$) were associated with PNB in 2014 to 2018.

Conclusion: Our analysis of the NACOR database revealed an increase in annual proportion of PNB utilization in outpatient mastectomy and lumpectomy in the years 2014 to 2018. In addition to year of procedure, sex, facility region, and use of tissue expander were found to be associated with PNB use. Given the many benefits of regional anesthesia, we expect these trends to continue with even more PNB use across oncological surgery.

Figure 1: Annual proportion of peripheral nerve block (PNB) use in mastectomy and lumpectomy.