

PD-19. CONTINUOUS AXILLARY CATHETERS AND NEUROLOGIC INJURY

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Continuous axillary brachial plexus block is widely used in the postoperative management of complex upper extremity procedures. Advantages include superior pain relief during early mobilization as well as upper extremity sympathetic blockade (1). However, the incidence of neurologic injury related to this modality of analgesia is virtually unknown. The aim of the current study is to investigate the frequency and potential risk factors associated with neurologic complications during continuous axillary brachial plexus blockade.

The medical records of all patients undergoing continuous axillary blockade at the Mayo Clinic from 1985-2000 were retrospectively reviewed. Patient demographics and past medical history including a previous diagnosis of diabetes, reflex sympathetic dystrophy or complex regional pain syndrome, and pre-existing neurologic disease (proximal neuropathy, mononeuropathy, peripheral neuropathy) was documented. The surgical procedure, incision to closure time, the use and duration of tourniquet inflation, and the indication for catheter placement (reimplant sympathectomy, elbow rehabilitation, chronic pain) were all recorded. Details of catheter insertion including time of placement (pre-, intra-, or post-op; awake vs under GA), technique used (nerve stimulation vs loss of resistance), the elicitation of a paresthesia, and motor response(s) obtained were all reviewed. Local anesthetic use (+/- epi), bolus volumes, infusion rates and required changes, and concurrent opioid use were all documented. Finally, postoperative complications including axillary infection or hematoma formation and the development of new or worsening preoperative neurologic deficits were carefully examined.

Two-hundred thirty-eight axillary catheters (N=238) were placed during the study period of which 183 (77%) were used for acute postoperative pain management during elbow rehabilitation. One-hundred forty-four (61%) patients were men while the remaining 94 (39%) were women. Mean patient age was 39 +/- 15 years (range: 7-79 yrs). Associated co-morbidities included diabetes (1.7%), reflex sympathetic dystrophy (4.6%) and pre-existing neurologic disease (9.2%). The majority of pre-existing neurologic deficits (94%) consisted of one or more mononeuropathies within the surgical extremity. A tourniquet was used in 222 (93%) patients with a mean duration of 87 +/- 50 minutes. Forty-seven (20%) catheters were placed pre-operatively, 5 (2%) intra-operatively under general anesthesia, and 186 (78%) post-operatively in the recovery room. A motor response was elicited in 216 (91%) patients with 33 (14%) patients also reporting a paresthesia during catheter placement. Catheters were initially bolused with a variety of local anesthetic solutions including chloroprocaine, lidocaine, mepivacaine, and bupivacaine. Epinephrine was used in 124 (52%) patients.

Post-operatively, local anesthetic infusions consisted of 0.5-1.0% mepivacaine in 22 patients and 0.125-0.25% bupivacaine in 213 patients. Mean catheter duration was 57 +/- 31 hours. Supplemental intravenous opioids were required in only 131 (55%) patients on Post-operative Day 1 and 124 (52%) on Day 2. Thirteen (5%) catheters were replaced because of inadequate analgesia. Post-operative complications occurred in 2% of patients (Table 1). Of these, 2 (0.8%) patients experienced new post-operative neuropathies. In one patient, new onset numbness was diagnosed upon discontinuation of the axillary catheter on Post-operative Day 5 and persisted for 5 months. The other patient had a catheter in place for 2 days post-operatively, and did not complain of digital numbness until her 3-week post-operative follow-up. Symptoms persisted in this patient for 7 months. Neither patient had pre-existing neurologic deficits, prolonged tourniquet inflation times (75 and 29 minutes, respectively) or paresthesias upon catheter placement.

Continuous brachial plexus blockade has clear advantages in a variety of upper extremity surgical procedures (1). However, complication rates during these continuous catheter techniques remains largely unknown. Factors such as the presence of an indwelling catheter, prolonged exposure to local anesthetics, as well as the complex nature of these surgical procedures may conceptually increase the risk of neurologic injury. However, despite these theoretical concerns, the neurologic complication rate observed within this study (0.8%) is comparable to those previously reported with continuous catheter (2) as well as single injection techniques (3,4). Therefore, continuous axillary catheters may be considered a safe and effective means of prolonged brachial plexus blockade.

1. Wajima Z, et al. *Br J Anaesth* 1995;74:392-5.

2. Sada T, et al. *Can Anaesth Soc J* 1983;30:201-5.

3. Auroy Y, et al. *Anesthesiology* 1997;87:479-86.

4. Urban MK, et al. *Reg Anesth* 1994;19:175-82.

COMPLICATION	PATIENTS (N)	PERCENT (%)
New neuropathy	2	0.8
Hematoma	2	0.8
Infection	0	0
Other	1	0.4
TOTAL	5	2.0