

infusion, however, reduces VAS scores for the duration of the infusion as demonstrated in Figure 3 in our article.

Opioid consumption on the other hand is an indirect measure of pain intensity. We agree that PCB is associated with an opioid-sparing effect, and therefore a lower cumulative opioid intake after surgery. Our review shows significantly lower opioid consumption up to 24 h after surgery.

Cumulative opioid consumption, however, provides no information on the duration of block with PCB. In fact, as a result of opioid sparing in the early postoperative period, cumulative opioid consumption would be expected to be lower in patients who have received a PCB at all time periods after surgery. To estimate the duration of block with PCB using opioid consumption, it makes more sense to analyse hourly opioid consumption or opioid consumption over short time intervals within a 48 h period. Unfortunately, these data are not available in the literature we identified for review.

We therefore reiterate our finding that compared with the gold standard (postoperative opioid titration), PCB is only effective for analgesia during the first 4–8 h after surgery. This analgesic effect results in reduced opioid titration in the early postoperative period which in turn results in a lower cumulative opioid intake after surgery. This conclusion is consistent with Dr Byreddy's findings, although we cannot confirm his observation of reduced cumulative opioid consumption beyond 24 h as a result of lack of data in the studies we analysed. Our conclusion also supports the PROSPECT guidelines³ on single-injection PCB for hip surgery which recommends a cautious appraisal of the risk/benefit ratio of single-injection PCB on a case-by-case basis.

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Chlorhexidine anaphylaxis in Auckland

Editor—Parkes and colleagues¹ case presentations and thorough discussion relating to chlorhexidine anaphylaxis

prompted me to review our experience of chlorhexidine anaphylaxis at the Anaesthetic Allergy Testing Clinic within the Auckland City Hospital. This Clinic provides an anaesthetic allergy testing service for the Greater Auckland region of New Zealand. Some referrals from smaller centres in the country are also received.

Since 1998, we have encountered 26 patients with a clinical picture in keeping with anaphylaxis to chlorhexidine. Most of these patients had raised mast-cell tryptase (MCT) levels and all tested positive on skin-prick testing, using 2% aqueous skin wash. In every case (except one), we performed skin tests against all agents administered before the adverse event. These include anaesthetic agents, antibiotics, and ancillary drugs such as latex and chlorhexidine.

Parkes and colleagues noted responses to Instillagel[®] which contains chlorhexidine 0.25% in lidocaine gel 2%. The urinary lubricant used in Auckland is produced by Pfizer. This contains chlorhexidine 0.05% in lidocaine gel 2%. Our first patient, a woman, in 1998, responded adversely to the skin wash Hibitane[®] (chlorhexidine 1% in alcohol 70%). However, the majority of cases were in response to the urinary lubricant. Most were men, and three occurred in the recovery room when awake. Three patients have anaphylaxis to chlorhexidine immediately after the insertion of chlorhexidine-impregnated central lines.

It is of interest that chlorhexidine products are increasingly being recommended for dental hygiene, periodontal care, and implant surgery. Savacol[®] (Colgate) is frequently used by dental surgeons. The concentrated solution contains 2 mg ml⁻¹, but when appropriately diluted, it becomes a 0.2% solution of chlorhexidine as the dental wash. We receive many referrals each year from dental surgeons and general practitioners requesting testing for the local anaesthetic agents, on the grounds of the patients' history, although all are aware that allergy to the now commonly used amide–amide local anaesthetics is extremely rare. Adverse reactions are usually due to vasovagal responses, hyperventilation, or inadvertent intravascular injection. Nevertheless, latex testing has been included in testing these patients. Now, based on our perception that chlorhexidine is a significant cause of type 1 hypersensitivity reactions, we are including the skin-prick test for this agent in the protocol for assessment of these patients.

Another issue raised by the authors was the fact that the serum MCT is not always raised in an anaphylactic reaction. As mentioned, this is probably due to an immediate basophilic response. Basophils are circulating blood cells that contain virtually no tryptase; in contrast, tryptase-rich mast-cells are present mainly in connective tissue and also in mucosae. We too have noted an increase in referrals of subjects with possible anaphylactic reactions in the absence of an MCT increase. There is an increasing awareness of among Auckland anaesthetists

of perioperative anaphylaxis, so it is postulated that the adverse clinical events are diagnosed and treated early, before the cascade of anaphylaxis reaching the mast-cells! Unfortunately, the *in vitro* basophil activation test, which could help to throw more light on some of the difficult cases, is not yet available here. In the past year, an ELIZA test for chlorhexidine has become available (ImmunoCap250®). The results of this test correspond well with skin-prick testing.

After a positive response, patients are warned of chlorhexidine being present in a number of antiseptic creams, medicated soaps, and mouth washes. Although intact skin

is a good barrier, there have been several reports of contact dermatitis to this antiseptic.

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