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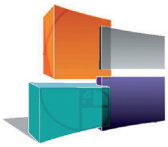

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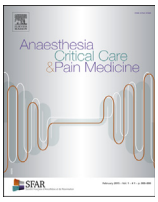

Letter to the Editor

Predictors of a successful medial canthus block for eye surgery

1. Introduction and methods

Ophthalmic surgical procedures account for a significant proportion of all surgeries performed worldwide. Due to potential specific serious complications including brain stem anaesthesia, retrobulbar haemorrhage, risk of ocular perforation increased by the presence of myopic staphyloma, and optic nerve injury [1], eye blocks require skilled anaesthetists.

Medial canthus block is an increasingly popular method to achieve regional anaesthesia for eye surgery. A single medial canthus injection has been shown to be more reliable and effective than peribulbar anaesthesia in terms of akinesia and rate of requirement of supplemental injection [2]. This technique also theoretically reduces the risk of globe perforation since myopic staphyloma - the main risk factors of perforation - are frequently located posteriorly or inferiorly to the globe but not very frequently on the medial part of the globe. However, success rates and predicting factors for efficacy using this technique are not well characterised. We conducted a prospective observational study over a 24-month period to describe failure rates and assess factors associated with success of such blocks performed by experienced anaesthetists.

After sterile preparation of the injection site, local conjunctival anaesthesia by oxybuprocaine, a 25-gauge 32 mm needle was introduced perpendicularly to the caroncule. On negative aspiration, an injection of at least 6 ml of local anaesthetic composed by a standardised mixture of 0.75% ropivacaine and 2% mepivacaine (half of each) was delivered at a depth of around 25 mm The volume injected was subjected to digitally perceived intra-ocular pressure. Unsuccessful blocks were completed by the surgeon with a sub-tenon injection.

A three-category classification for akinesia was used to simplify the interpretation of the results. Akinesia was scored as follows : 1 = total akinesia - no movement in any plane, 2 = satisfactory akinesia - less than 2 mm of movement in any direction, not warranting further action before surgery could commence, and 3 = unsatisfactory akinesia - greater than 2 mm of movement in any one or more direction warranting further supplemental injections. If the akinesia score remained at 3 at 5 minutes, then a further 2–4 mL of the mixture was administered using the same approach. Block success was defined by an akinesia score of 1 or 2. A blinded attending anaesthetic nurse assessed the quality of blocks.

We used a convenience sample, based on the time and availability of each anaesthetist. The data of 1690 eligible consecutive patients for retinal surgery performed under regional anaesthesia were prospectively collected and analysed from August 1, 2015 to August 1, 2017. Patient characteristics are detailed in Table 1. A single injection was sufficient for the completion of surgery in 1510 (89%) patients. Overall, supplemental injection was necessary in 180 cases (11%), including 118 (7%) cases for lack of akinesia and 62 (4%) cases for incomplete analgesia at incision. Significant differences were found between the success and failure groups with respect to a previous surgery performed on the eye (OR 5.6 [95%CI 2.9–6.7]), adequate eye ball movement during puncture (OR 4.2 [95%CI 3.8–6.3]), occurrence of ptosis without lid fullness (OR 2.2 [95%CI 1.2–3.9]). No difference was observed between the success and failure groups with respect to the presence of early onset of chemosis or injected volume (Table 2). No postoperative complications were reported at immediate follow-up.

2. Discussion and conclusion

This prospective study found several factors impacting medial canthus block success. First, previous surgery on the operated eye as a predictor of failure may be explained by adherences and fibrosis hampering adequate diffusion of the local anaesthetic. Multisite injection in re-operated eyes may improve anaesthesia efficiency. Second, eye return movement reflects the needle passing through the inter-muscular septum ensuring intracone space position. This visible displacement is more easily detectable than change in resistance when progressing with the needle. Absence of lid fullness also suggests the injection is performed in the right space. Local anaesthetics access to the innervation of the superior oblique muscle and the orbicularis muscle explain the ptosis. Although the injected volume determines the degree of abolition of extra-ocular muscle movement in some studies [3], a higher quantity of local anaesthetic was not independently associated with block success in our study. This result may be explained by the small amount of local anaesthetic required to achieve satisfactory blocks using this technique. Early onset of chemosis during injection suggests that the needle should be repositioned. On the other hand, too much volume injected in the

Table 1
Main characteristics of the patients ($n = 1690$).

Age (year)	49 ± 16
Weight (kg)	71 ± 16
Height (cm)	169 ± 9
Male/female	860/830
Side right/left	900/790
Previous surgery on the eye	700 (41)
ASA physical status	
I	810
II	650
III	230
IV	0

Data are expressed as proportion or mean ± standard deviation.

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Table 2
Factors associated with block success ($n = 1690$).

Criteria	Unadjusted OR [95% CI]	*P*-value	Adjusted OR [95% CI]	*P*-value
No previous surgery on the operated eye	4.5 [2.9–5.1]	<0.001	5.6 [2.9–6.7]	<0.001
Adequate eyeball movements	6.5 [1.3–7.8]	0.02	4.2 [3.8–6.3]	<0.001
Ptosis with absence of lid fullness	3.5 [2.4–5.8]	<0.001	2.2 [1.2–3.9]	0.03
Injected volume > 8 mL	2.2 [1.1–4.9]	0.02	2.0 [0.8–6.3]	0.11
Early onset of chemosis	0.5 [0.4–0.9]	<0.001	0.7 [0.3–0.9]	0.04

right space may induce a chemosis and should invite stopping administration of local anaesthetics.

The present report has several limitations. Peri-operative pain perception can be influenced by residual sedation administrated to perform blocks. We also did not take into account certain comorbid conditions such as diabetes, which might have had undocumented peripheral neuropathy. Finally, although our results are based on a large registry, additional studies involving multi-institution collaboration are required to increase external validity and better characterise the relationship between comorbid conditions and block outcome.

In conclusion, medial canthus anaesthesia is an efficient approach for eye surgery providing anaesthetists being aware of the factors predicting success in order to communicate uncertainty to surgeons or perform a new block.

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Authors' contributions

GG designed, and planned the study. GG, SR, DH, JL performed the study, analysed the data and wrote the first draft; GG and CB revised the manuscript. All authors read and approved the final manuscript. GG is guarantor of the paper.

Disclosure of interest

The authors declare that they have no competing interest.

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