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Anesthesia

The Profile of Locoregional Anesthesia in Trauma Surgery at the Department of Anesthesia, Ibn Tofail Hospital

F Moussaid H Moutia*, M Khelouki
Department of anesthesia at Ibn Tofail hospital, Rue Abdelouahab Derraq, Marrakech 40000, Morocco

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***Corresponding author**
F Moussaid H Moutia

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Abstract: Locoregional anesthesia (LRA) is one of the major management techniques of anesthesia. It includes peripheral nerve blocks (PNB) and central blocks (spinal anesthesia and epidural anesthesia). Locoregional anesthesia (LRA) is integrated in an anesthesia protocol alone or in a postoperative analgesia protocol, this technique offers a faster rehabilitation to patients and reduces the incidence of chronic pain, while avoiding certain risks of general anesthesia (curare, difficult intubation, controlled ventilation..). Locoregional anesthesia requires identification of the nerve, mainly by two methods: neurostimulation (use of a low current) and ultrasound (requiring a learning curve). The potential risks of LRA are to mask the pain of compartment syndrome, the massive bleeding at sympathetic block installation, and a failure that leads conversion to general anesthesia. The aim of this article is to study the place of Locoregional anesthesia in trauma surgery at the Ibn Tofail University Hospital, through a descriptive study.
Keywords: Locoregional anesthesia (LRA), anesthesia, rehabilitation.

INTRODUCTION

Over the past 25 years, Locoregional anesthesia (LRA) has grown considerably in France, from 4% for 3.6 million procedures in 1980 to 21% for 8 million anesthesia in 1996 [1].

Locoregional anesthesia, specifically peripheral nerve blocks, which is based on the principle of making a nerve block by applying a local anesthetic solution by the nerves or the nerves connections.

To locate the nerve, two techniques are deployed: neurostimulation, which consists in applying an electric current of low intensity, and ultrasound, which allows the possibility of visualizing in real time the nerve structures, the diffusion of local anesthetic, as well as the anatomical structures surrounding the vessels. This method of identification offers the comfort of "live" visualization of the needle during puncture, considerably reducing the risk of vascular puncture [2]. Currently, ultrasound guidance is becoming the gold standard in Locoregional anesthesia [3].

The main benefits of peripheral nerve blocks are to stop nociceptive pain, neuropathies and reduce the risk of pain syndrome chronization, reduce opioid consumption and adverse effects, reduce systemic inflammatory reaction syndrome, improve local vascularization through prolonged sympathetic block, and facilitate nursing.

Peripheral nerve blocks still remains, like any medical procedure, associated with potential risks, such as the risk of injecting the anesthetic agent into vessels blood or assimilating it too rapidly into the bloodstream, injection into the nerve with the possibility of damage, allergic risk, and the failure with conversion to general anesthesia.

MATERIALS AND METHODS

This is a retrospective, descriptive study carried out over a 12-month period, from March 2017 to March 2018, within the Anesthesia department of Ibn Tofail Hospital, Marrakech.

Included were patients planned for a scheduled or urgent trauma surgery consistent with the realization of a peripheral nerve block.

Exclusion criteria included: patient refusal, hemostasis disorders, allergy to local anesthetics, infection at the puncture site, placement of a peri-nervous catheter, and spinal surgery.

The data collected included demographics data, surgical data, and data related to peripheral nerve block: location and nature of the bloc, the local anesthetic used, the duration of the block, the block's success and the occurrence of complications. The statistical analysis used Microsoft Excel.

RESULTS

During the study period, 156 peripheral nerve blocks were performed as part of trauma surgery. The average age was 51+/-19 years (17 to 75); the sex ratio M/F :1,6. The pre-anesthetic evaluation, according to ASA class, objectified 124 cases in class I (79%), 23 cases in class II (15%), and 9 cases in class III (6%). The pathological history of our patients is reported in the table-1.

Table-1: Distribution of medical history.

Pathologic history	No. of Cases	Percentage
Diabetes	19	12,1 %
Arterial hypertension	10	6,4 %
heart diseases	3	2%
Chronic kidney disease	1	0,5 %

Upper limb injuries were the most common in our series, with 121 patients (77%) (Table-2).

The scheduled surgery was predominant (72%) (Figure-1), the peripheral nerve blocks of the upper limb represented 77.5% (Figure-2).

Table-2: Distribution of trauma types and siting.

	Type	No. of Cases
upper limb	Fracture	83
	Tendon wound	15
	Material removal of osteosynthesis	8
	Pseudarthrosis	10
	Phlegmon	3
	Others	2
Lower limb	Diabetic foot	18
	Ischemia of lower limb	8
	Material removal of osteosynthesis	5
	Hallux valgus	2
	Others	2

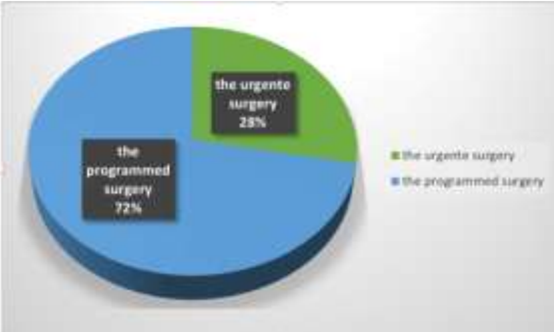

Fig-1: Distribution of type of trauma surgery

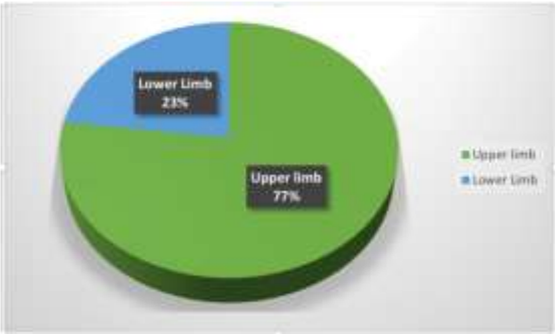

Fig-2: Distribution of peripheral nerve blocks according to the location of the trauma

The axillary nerve block was the majority in the peripheral nerve blocks of the upper limb, with a percentage of 78% (Figure-3), while the infraglutal and femoral sciatic block was most common in the lower limb blocks (Figure-4).

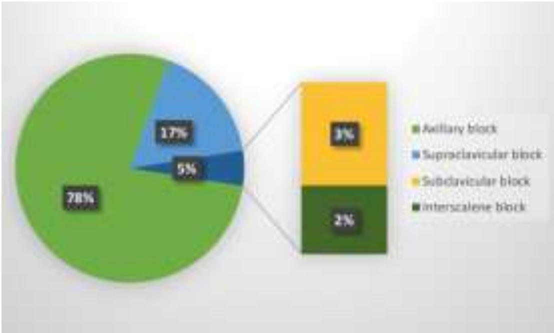

Fig-3: Distribution of the different nerve blocks of the upper limb

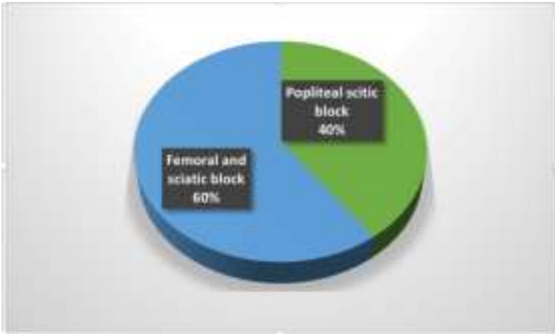

Fig-4: Distribution of the different nerve blocks of the lower limb

The identification of the nerve in this study, was through a combined method, between ultrasound and neurostimulation in 98 nerve blocks, (63%). In addition, all the blocks were made with an anesthetic mixture of Lidocaine 20% and Bupivacaine 5%, with different injection volumes depending on the nerve block seat (Table-3).

Table-3: Volume of local anesthetic injected according to the nerve block

	Block Type	Volume (ml)
Upper limb	Axillary	25 +/- 5
	Interscalenic	22 +/- 6
	Supraclavicular	26 +/-5
	Infraclavicular	30 +/- 8
Lower limb	Sciatic and femoral block	36 +/8
	Popliteal sciatic block	19+/-4

The duration of the peripheral nerve block was variable, depending on the type of the block. The overall average was 10.5 minutes (Table-4).

The block's success was noted in 142 patients (91%). The highest failure rate was observed in the interscalenic blocks with a rate of 33%.

Table-4: Duration of the realization of the Nervous Blocks.

	Block Type	Realization's duration (minutes)
Upper limb	Axillary	10,5 +/- 4
	Interscalenic	11+/- 3
	Supraclavicular	10 +/-6
	Infraclavicular	9 +/- 3
Lower limb	Sciatic and femoral block	13+/- 5
	Popliteal sciatic block	9 +/- 3

The immediate complications were dominated by vascular puncture. In addition, only one case of neurological toxicity was noted (convulsion and consciousness disorder), during a supraclavicular block, the evolution was favourable in the postoperative period.

DISCUSSION

Peri-nervous locoregional anesthesia (PN-LRA) is one of the major charges in intensive care anesthesia for both anesthesia and postoperative analgesia [4, 3, 5].

In France, the use of locoregional anesthesia (LRA) techniques has been increasing steadily for 20 years [1]. In 1996, 15,5 % of anesthesia procedures were performed in emergency, mainly in orthopaedic surgery and traumatology (44 % of urgent anesthesia in university hospitals) [6]. The usual population of traumatology is young and often male population.

In 1996, 19% of emergency anesthesia procedures were performed with an LRA technique [6], and up to 80% in some teams of anesthesiologists working specifically in emergency departments. In our study, LRA was practiced in 28% as part of urgent surgery.

The peri-nervous locoregional anaesthesia (PN-LRA) in the emergency service setting avoids two main risks of general anesthesia: the chemical pneumonitis after inhalation of gastric and respiratory depression [7].

Among the 77% of peripheral nerve blocks of the upper limb, the axillary block was the most used (78%), explained by the ease of realization, the low risk of complication and by its broad indications (any upper limb surgery below the elbow) [8]. These results are similar to the data from the multicentre study conducted in 2007 in France by Fuzier *et al*., with 64% of axillary blocks [9].

Similar to the axillary block at the upper limb, the femoral block remains the most widely used block among the lower limb blocks the multicentre study conducted in 200710].

The nerve electrostimulation is a proven modality to determine the close proximity between the needle and nerve, this method has been used for decades, and associated with a high success rate and fewer complications [11]. Ultrasound-guided allows real-time visualization of the needle to target the nerve [11].

The ultrasound-guided can be done by two techniques: the approach in the plan: simpler, allows a visualization of the needle in its totality and especially its end, and the approach out of plan consists in introducing the needle perpendicularly to the probe [12]. Currently, it is difficult to define an ideal and absolute ultrasound approach. Both techniques continue to evolve to improve success and usability.

Neurostimulation was combined with ultrasound in 63% of the nerve blocks performed in our study, which was demonstrated by the study of Chan *et al*., [13, 14] by performing an ultrasound-guided interscalenic and supraclavicular nerve block coupled with neurostimulation. The initial learning curve of ultrasound calls for neurostimulation for several reasons: to confirm the reality of the positioning of the needle near nerve structures, in case of difficulty in visualizing the nervous elements, or in case of poor echogenicity [15].

Neurostimulation coupled with ultrasound offers the possibility of reducing the frequency of intra neural injections and improving safety during PN LRA procedures [16].

In order to prolong the duration of action of local anesthetics (LA) and reduce the installation time of nerve blocks. The mixture Bupivacaine and Lidocaine was widely used in our study. However, the use of a mixture of local anesthetics is not recommended by learned societies, so the French society of anesthesia and resuscitation advises against mixing a long-acting LA (Ropivacaine, Bupivacaine, Levobupivacaine) with a short-acting LA (Lidocaine, Mepivacaine) [17]. The only potential interest is the gain on installation time, with a benefit in terms of recovery of the sensing block that remains controversial.

The average overall duration of nerve blocks was 10.5 minutes, which remains comparable to the data in the literature.

During this study, the overall success rate was 92.2%, reflecting a good mastery of the technique by the medical team of Ibn Tofail University Hospital Centre, this adds up to a study by Toulouse University Hospital published in 2015 with a success rate of 95%.

CONCLUSION

In recent years, peri-nervous locoregional anesthesia has undergone significant development, in terms of a low-cost profile, good quality of postoperative analgesia, and a reduction in certain adverse effects of general anesthesia. The absence in the literature of work formally concluding a benefit in terms of mortality of LRA compared to general anesthesia, both in scheduled surgery and in emergency, thus, the choice of anesthesia is based on the benefit/risk ratio depending on the field, the patient, the context and the technical conditions anticipated.

REFERENCES

1. Laxenaire MC, Auroy Y, Clergue F, Péquignot F, Jougla E, Lienhart A. Anesthésies en urgence. InAnnales francaises d'anesthesie et de reanimation 1998 Jan 1 (Vol. 17, No. 11, pp. 1352-1362). Elsevier Masson.
2. Lewis SR, Price A, Walker KJ, McGrattan K, Smith AF. Ultrasound guidance for upper and lower limb blocks. The Cochrane Library. 2015 Jan 1.
3. Griffin J, Nicholls B. Ultrasound in regional anaesthesia. Anaesthesia. 2010 Apr;65:1-2.
4. d'Organisation C. Gestion pre-operatoire du risque infectieux. J Chir. 2004;21.
5. Horlocker TT, Birnbach DS, Connis RT, Nickinovich DG, Palmer CM, Pollock JE, Rathmell JP, Rosenquist RW, Swisher JL, Wu CL. Practice advisory for the prevention, diagnosis, and management of infectious complications associated with neuraxial techniques: a report by the American Society of Anesthesiologists Task Force on infectious complications associated with neuraxial techniques. Obstetric Anesthesia Digest. 2011 Jun 1;31(2):85.
6. Laxenaire MC, Auroy Y, Clergue F, Péquignot F, Jougla E, Lienhart A. Anesthésies en urgence. InAnnales francaises d'anesthesie et de reanimation 1998 Jan 1 (Vol. 17, No. 11, pp. 1352-1362). Elsevier Masson.
7. Régnier JM, Rossignol B, Genco G, Picart F, Egreteau JP. Evaluation de l'anesthésie loco-régionale dans un bloc de traumatologie d'urgence. Cahiers d'anesthésiologie. 1994;42(4):545-8.
8. Ranganath A, Srinivasan KK, Iohom G. Ultrasound guided axillary brachial plexus block. Medical ultrasonography. 2014 Sep 1;16(3):246-51.
9. Fuzier R, Tissot B, Mercier-Fuzier V, Barbero C, Caussade D, Mengelle F, Villaceque E, Virenque C, Samii K, Ducasse JL. Évaluation de l'utilisation de l'anesthésie locorégionale dans un service d'urgence. InAnnales francaises d'anesthesie et de reanimation 2002 Mar 1 (Vol. 21, No. 3, pp. 193-197). Elsevier Masson.
10. Szucs S, Morau D, Iohom G. Femoral nerve blockade. Medical ultrasonography. 2010 Jun 1;12(2):139.
11. Urmey WF. Electrical nerve stimulation and locoregional anesthesia: New modalities. European Journal of Pain Supplements. 2011 Nov;5(S2):499-505.
12. Bloc S, Ecoffey C, Dhonneur G. Controlling needle tip progression during ultrasound-guided regional anesthesia using the hydrolocalization technique. Regional anesthesia and pain medicine. 2008 Jul 1;33(4):382-3.
13. Chan VW. Applying ultrasound imaging to interscalene brachial plexus block1. Regional anesthesia and pain medicine. 2003 Jul 1;28(4):340-3.
14. Chan VW, Perlas A, Rawson R, Odukoya O. Ultrasound-guided supraclavicular brachial plexus block. Anesthesia & Analgesia. 2003 Nov 1;97(5):1514-7.
15. McCartney CJ, Brauner I, Chan VW. Ultrasound guidance for a lateral approach to the sciatic nerve in the popliteal fossa. Anaesthesia. 2004 Oct;59(10):1023-5.
16. Steinfeldt T, Schwemmer U, Volk T, Neuburger M, Wiesmann T, Heller AR, Vicent O, Stanek A, Franz M, Wulf H, Kessler P. Nerve localization for peripheral regional anesthesia. Anaesthesist. 2014 Jul 1;63(7).
17. Vivien B, Adnet F, Bounes V, Chéron G, Combes X, David JS, Diependaele JF, Eledjam JJ, Eon B, Fontaine JP, Freysz M. Recommandations formalisées d'experts 2010: sédation et analgésie en structure d'urgence (réactualisation de la conférence d'experts de la SFAR de 1999). Annales françaises de médecine d'urgence. 2011 Jan 1;1(1):57-71.