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REGIONAL BLOCK AS S MONO-METHOD OF ANESTHESIA FOR SURGICAL INTERVENTIONS ON THE BRACHIOCEPHALIC VESSELS

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РЕГІОНАРНИЙ БЛОК ЯК МОНОМЕТОД ЗНЕБОЛЕННЯ ОПЕРАТИВНИХ ВТРУЧАНЬ НА БРАХІОЦЕФАЛЬНИХ СУДИНАХ

Гордовенко Д., Сухонос Р.

Каротидна ендартеректомія (КЕА) є бажаним вибором лікування пацієнтів із мультифокальним атеросклеротичним ураженням брахіоцефальних артерій (БА). Оптимальним методом знеболення під час КЕА можна вважати блокаду шийного сплетіння. Передбачається, що цей метод має певні переваги над загальною анестезією з точки зору моніторингу неврологічного статусу під час перехресного затискання сонної артерії, оскільки в пацієнтів у свідомості контроль таких показників, як мова, свідомість і моторна функція, дають достатньо інформації для своєчасного попередження порушення мозкової перфузії. Сучасний розвиток регіонарної анестезії під УЗД-контролем дає змогу ефективно знеболювати пацієнтів в інтра- та післяопераційний період і знизити або зовсім відмовитися від використання наркотичних аналгетиків, що прискорює період відновлення пацієнта після оперативного втручання. З огляду на анатомічні ділянки – зони проведення оперативного втручання КЕА видом анестезії може бути вибрана регіонарна анестезія: поверхневий або глибокий блок шийного сплетіння, що показав себе ефективним як компонент моноанестезії та аналгезії.

Ключові слова: блок шийного сплетіння, брахіоцефальні судини, ендартеректомія, моноанестезія, регіонарні блокади, судинна хірургія.

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REGIONAL BLOCK AS S MONO-METHOD OF ANESTHESIA FOR SURGICAL INTERVENTIONS ON THE BRACHIOCEPHALIC VESSELS

Hordovenko D., Sukhonos R.

Carotid endarterectomy (CEA) is the preferred treatment choice in patients with multifocal atherosclerotic lesions of the brachiocephalic arteries (BA). The optimal method of anesthesia for carotid endarterectomy is cervical plexus block. We assume that this method has certain advantages versus general anesthesia in terms of monitoring the neurological status during carotid cross-clamping, since in conscious patients, monitoring of such indicators as speech, consciousness, and motor function provides sufficient information for timely prevention of cerebral perfusion disorders. The modern development of regional anesthesia using ultrasound guidance allows for effective anesthesia in the intra- and postoperative period and reduces or avoids the use of narcotic analgesics, which accelerates the patient's recovery period after surgery. According to the anatomical areas of the CEA surgical intervention, regional anesthesia can be chosen as a type of anesthesia: superficial or deep cervical plexus block, which has proven to be effective as a component of monoanesthesia and analgesia.

Key words: cervical plexus block, brachiocephal vessels, endarterectomy, monoanesthesia, regional block, vascular surgery.

Introduction. Multi-vessel disease including the brachiocephalic artery remains a relatively rare finding in atherosclerotic disease when compared to stenosis of other major vasculature. Its management presents many difficulties.

Atherosclerotic disease is a systemic pathological state, which most commonly presents as carotid stenosis [1]. The involvement of the brachiocephalic artery is less common [2–4]. Stenosis in the brachiocephalic artery happens less than two percent of the time in all extracranial causes of cerebrovascular insufficiency [2, 5]. Symptoms typically include visual alterations, pain in the right upper extremity, transient ischemic attacks (TIAs), syncopal episodes, or potentially even cerebrovascular accidents (CVA). Additionally, due to the location of the stenotic occlusive disease in the brachiocephalic artery, subclavian steal syndrome may occur [6].

Carotid endarterectomy surgery is commonly performed under cervical plexus block [7–9]. This is presumed to offer advantages over general anaesthesia in terms of monitoring neurological function during cross-clamping of the carotid artery since, in conscious patients, speech, cerebration, and motor power provide early measures of inadequate cerebral perfusion [10]. Some studies also claim lower shunting requirements, lower cardiovascular morbidity, and shorter hospital stay [11].

Traditionally, the common methods of cervical plexus block are termed 'deep' or 'superficial'. The deep block consists of identifying the transverse processes of upper cervical vertebrae C2–C4 and injecting local anaesthetic directly into the deep (prevertebral) cervical space. This may be achieved either as three separate injections or as a single injection.

The superficial block incorporates a variety of procedures. The simplest is a s.c. infiltration of local anaesthetic along the posterior border of sternocleidomastoid muscle by either the surgeon or the anaesthetist.

An 'intermediate' block is one where the injecting needle pierces the investing fascia of the neck, deep to the s.c. layer, but superficial to the deep cervical (prevertebral) fascia.

It is also possible to use a 'combined block', consisting of a deep injection and a superficial or intermediate injection [12].

Discussion. A 74-year-old male patient was diagnosed with severe stenosis of the right internal carotid artery. The patient was scheduled for carotid endarterectomy to remove the atherosclerotic plaque. Due to his age and history of stroke, it was decided to perform the surgery under regional anesthesia to allow for neurological monitoring during the procedure.

Nerve block technique:

The patient was placed in a supine position with the neck slightly extended and rotated away from the side to be blocked. Next, a high-frequency linear ultrasound transducer was positioned to visualize the cervical plexus along the posterior border of the sternocleidomastoid muscle. Under ultrasound guidance, a 22-gauge, 50 mm needle was inserted using an in-plane approach. After negative aspiration and confirming correct needle placement, 10 mL of 0.375% ropivacaine was injected incrementally around the cervical plexus, while monitoring for signs of intravascular or intrathecal injection.

Patient outcome:

The carotid endarterectomy was successfully completed under the cervical plexus block, with the patient remaining awake and responsive throughout the surgery. No neurological changes were noted during the clamping of the carotid artery, supporting the benefit of neurological monitoring made possible by regional anesthesia. Postoperative pain was well-managed, and no complications were observed.

Conclusion. Cervical plexus block has proven itself to be effective as a mono-method of anesthesia and analgesia using in the CEA, which allows for a significantly reduce number of opioids administered for analgesia in the perioperative period.

REFERENCES

1. Carotid-subclavian bypass for brachiocephalic occlusive disease. Choice of conduit and long-term follow-up. Law MM, Colburn MD, Moore WS, Quinones-Baldrich WJ, Machleder HI, Gelabert HA. *Stroke.* 1995; 26: 1565–1571.
2. Surgery of the aortic arch branches and vertebral arteries. Wylie EJ, Effeney DJ. *Surg Clin North Am.* 1979; 59: 669–680.
3. Clinical and hemodynamic significance of innominate artery lesions evaluated by ultrasonography and digital angiography. Grosveld WJ, Lawson JA, Eikelboom BC, Windt JM, Ackerstaff RG. *Stroke.* 1988; 19: 958–962.
4. Innominate artery occlusive disease: sonographic findings. Grant EG, El-Saden SM, Madrazo BL, Baker JB, Kliewer MA. *AJR Am J Roentgenol.* 2006; 186: 394–400.
5. Brachiocephalic arterial reconstruction. Damme HV, Caudran D, Defraigne JO, Limet R. https://pubmed.ncbi.nlm.nih.gov/1553848/. *Acta Chir Belg.* 1992; 92: 37–45.
6. Subclavian steal syndrome secondary to isolated innominate artery stenosis possibly due to fibromuscular dysplasia: a case report. Hirose H, Takagi M, Kugimiya T. *Vasc Endovasc Surg.* 1999; 33: 711–715.
7. JJ Pandit, S Bree, P Dillon, D Elcock, ID McLaren, B Crider. A comparison of superficial versus combined (superficial and deep) cervical plexus block for carotid endarterectomy: a prospective, randomized study. Anesth Analg, 91 (2000), pp. 781–786.
8. JJ Pandit, D Dutta, JF Morris. Spread of injectate with superficial cervical plexus block in humans: an anatomical study. Br J Anaesth, 91 (2003), pp. 733–735.

9. JJ Pandit, ID McLaren, B Crider. Efficacy and safety of the superficial cervical plexus block for carotid endarterectomy. Br J Anaesth, 83 (1993), pp. 970–971.
10. G Agrifoglio, FA Bonalumi. Prediction of cerebral ischaemia using loco-regional anaesthesia. Eur J Vasc Surg, 7 (Suppl A) (1993), pp. 13–15.
11. RJ McCarthy, R Walker, P McAteer, JS Budd, M Horrocks. Patient and hospital benefits of local anaesthesia for carotid endarterectomy. Eur J Vasc Endovasc Surg, 22 (2001), pp. 13–18.
12. JJ Pandit, S Bree, P Dillon, D Elcock, ID McLaren, B Crider. A comparison of superficial versus combined (superficial and deep) cervical plexus block for carotid endarterectomy: a prospective, randomized study. Anesth Analg, 91 (2000), pp. 781–786.