

SUBCORACOID BRACHIAL PLEXUS BLOCK FOR ANALGESIA IN BURN ARM

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Summary. Regional plexus nerve blocks are of height importance in acute pain management immediately after trauma injury of upper and/or lower extremities. Acute pain propagation associated with mediators liberalization is blocked on the first level what diminish/or minimizes the need for high dose and combinations of intravenous analgesics. In burn patients, high infection affinity of wide burn's area substantially limits the use of regional analgesia techniques in many cases. In this two trauma patients with upper, lower arm and hand burn injuries we would like to make a point of highly effective continuously subcoracoid brachial plexus block analgesia as simple and save variation of standard infraclavicular block.

Ključne riječi: Regionalna anestezija – blok pleksusa brahijalisa, subcorakoidni pristup; Terapija akutne boli – regionalna analgezija; Opekline – gornjeg ekstremiteta

Sažetak. Periferni blokovi živčanih ogranaka čine važan i satavni dio terapije akutne boli kod traumatskih ozljeda gornjih i donjih ekstremiteta. Regionalnom analgezijom se primarno zaustavlja osobađanje medijatora i propagacija akutne boli neposredno uz samo mjesto povređivanja. To najčešće u potpunosti zamjenjuje primjenu visokih doza intravenskih analgetika, ili bitno reducira njihovu ukupnu potrebitu dozu. Opečena i oštećena koža kod opeklinih ozljeda radi visokog infektivnog afiniteta u širokoj regiji u velikom broju slučajeva onemogućuje korištenje tehnika regionalne anestezije. Prikazom dvaju bolesnika sa opeklinama gornjeg ekstremiteta željeli smo istaknuti odličan analgetski učinak kontinuirane analgezije primjenom subkorakoidnog bloka kao jednostavnije varijante standardnog infraklavikularnim blokom.

Introduction

Regional plexuses and nerve blocks are of height importance in acute pain management immediately after trauma injury of upper and/or lower extremities. Perineural infiltration of local anesthetic develops neural transmission block with loss of sensitivity and motor straight. Consequently, acute pain propagation associated with mediators liberalization is blocked on the first level what diminish/or minimizes the need for high dose and combinations of intravenous analgetics. Skin damage in burn patients makes high infection affinity in wide burn's area what determines use of regional plexus blockade techniques in many cases. From this reason the indication for application of regional analgesia blockade has specific indication for each burn patient specifically.

The subcoracoid brachial block, as variation of the infraclavicular block was described by Whiffler in 1981.¹ The point of needle insertion is in the delto-pectoral groove and may be identified 2 cm caudal and 1–2 cm medial of the coracoid process. Subcoracoid block has become primary useful for anesthesia and surgery of the hand and forearm. Secondary, local anesthetic (LA) distribution after its application in point above the level of axillary and musculocutaneous nerve branches allowed a successful block of the whole arm except the medial part of the upper arm what belong to the innervations part of intercostobrachial nerve.²

This make a reason for using the subcoracoid brachial plexus block as »high axillary plexus block« for continuous or fractionated analgesia in mostly part of injured upper arm.

Following positive features of subcoracoid brachial plexus block, it could be of high efficiency in burn areas of hand, forearm and two lateral thirds of upper arm. It also allows good analgesia of interest area thought catheter technique with low incidence of its contamination. Given the anatomical landmarks of puncture and-point, serious complication (pneumothorax, arterial subclavia puncture, haemathopneumothorax) may be negligible to compare with infraclavicular brachial plexus block.

In this case report we would like to present efficiency of subcoracoid or »high axillary« brachial plexus block as modification of standard infraclavicular block in young man after electric burn injury of right upper arm, forearm and hand to compared with similar case where only intravenous and per orally analgesics were used.

Case report

Twenty two old young and healthy man (75 kg weight, ASA I status; GCS 15) has survived severe electrical burn injury of right upper arm, forearm and hand (8% II/III grades). Burns contracture of hand and fingers were presented. Early fasciectomy have been done in presence of

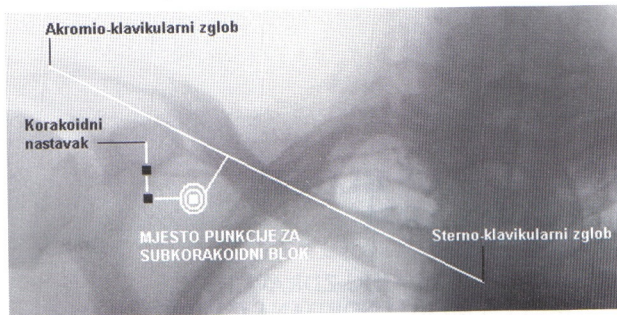


Figure 1. Puncture landmarks of subcoracoid block: 2 cm distal and 1.5 cm medial to the coracoid process, in delto-pectoral groove. Needle direction is directly caudal to the axillary's groove. When finger flexion are elicited by nerve stimulation we can expect an successful block.

Slika 1. Mjesto punkcije za subkorakoidni blok: 2 cm distalno i 1,5 cm medijalno od korakoidnog nastavka u delto-pektoralnoj udubini. Smjer igle je okomit prema sredini aksilarne jame. Stimulacijom dobiveni motorni odgovori skupine mišića šake jedini osiguravaju uspješnost izvedbe bloka.

forearm tissues compartment by extreme burn oedema (Figure 1a). Second patient, 45 years old man, diabetics and hypertonic (65 kg weight, ASA II status; GCS 15) has got deep burns of the distal parts of the fingers at the right arm by boiling water. Forearm and upper arm has been burned also (10% II/III grades) (Figure 1b). Immediately after the accident, the bought injured patients was admitted to the ICU of our burns department and resuscitation was started with appropriate fluid replacement in accordance with the guidelines for burns following the degree of burned affected skin surface. Initial intravenous analgesia has been achieved by bolus doses of opioid (morphine sulfat, 0.125–0.25 mg kg⁻¹) in bought patients. It has followed by continous intravenous morphine infusion (0.5 mg kg⁻¹/24 hours) by PCA pump with bolus dose (2.0 mg/h) on patient demand. Subcoracoid brachial plexus block analgesia (0.25% levibupivacain 30 ml) with catheter for continuously local anesthetic application (0.25% levibupivain 5–8 ml/h) was applied in the first patient. Pain (VAS) and sedation (Ramsey) score, mean arterial (MAP), heart rate and summary morphine consump-



Figure 2. a) 22 old young and healthy man (ASA I status; GCS 15) with electrical burn injury of right upper arm, forearm and hand (8% II/III grades); b) 45 years man (ASA II status, diabetic and hypertonic; GCS 15) with deep burns of the distal parts of the fingers, forearm and upper arm at the right arm by boiling water (10% II/III grades)

Slika 2. a) 22-godišnji zdravi muškarac (ASA I statusa, GCS 15) sa zadobivenim opeklinama desne nadlaktice, podlaktice i šake nakon udara električne struje (8% II/III); b) 45-godišnji muškarac (ASA II statusa; dijabetičar, hipertoničar; GCS 15) sa dubokim opeklinama podlaktice i vršaku prstiju desne šake

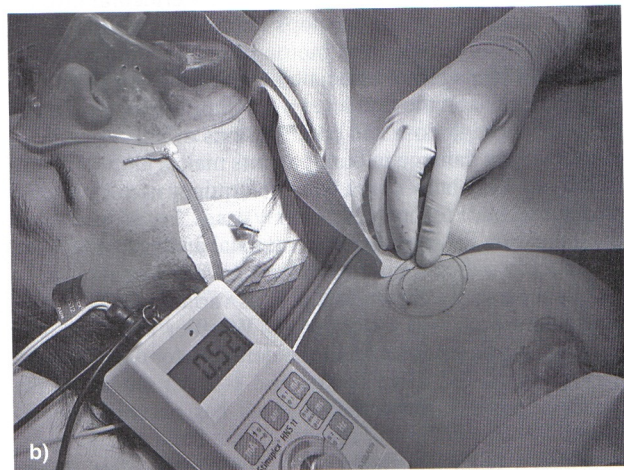
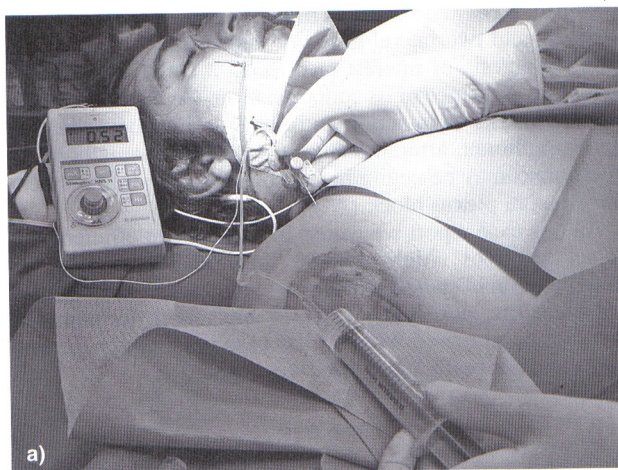


Figure 3. a) Subcoracoid brachial plexus block analgesia in patient with burn injuries of hand, forearm and upper arm; b) catheter for continous local anesthetic analgesia in situ

Slika 3. a) Detekcija blizine ogranaka brahijalnog živčanog snopa subkorakoidnim pristupom kod bolesnika sa opeklinom šake, podlaktice i nadlaktice uz pomoć neurostimulatora uz smanjenje jačine struje stimulacije do 0,52 mA; b) Uvođenje katetera za kontinuiranu regionalnu analgeziju

tion were assessed during the first 24 hours. In bought patient VAS score was acceptable and in the range between 2–4. Patient with subcoracoid block analgesia had 2 points by Ramsey sedation score and was cooperative, orientated and tranquil. Higher morphine consumption (58 mg vs. 38 mg/24 hours) with increasing demand doses (12 vs. 1 demand dose) of morphine during first 24 hours was found in patient without subcoracoid block analgesia. He was more sedated but had responded to command (3 point of Ramsey score). MAP was for 15% lower from the baseline in patient on morphine therapy alone. Heart rate did not changes during two different analgesic therapy under first 24 hours.

Conclusion

Regional anesthesia in burn injuries allows high analgesic benefit and also supports better circulation in damaged tissues. Unfortunately, its use is restricted with potential infected skin in wide burn area.

Subcoracoid brachial plexus block as modification of infraclavicular block is a simple injection technique with less

potential complication and relative secured place for catheter fixation. It allows good early analgesia in burn injured arms. In combination with intravenous morphine analgesia, subcoracoid block reduces consumption of intravenous morphine usually during the first 24 hours on the minimal level without enhancing patient sedation score. This result may be support with Perreault results. He pointed out that simple long-term intravenous morphine infusion dose varied greatly in different patient during first 24 hours (4–39.5 mg/h) (3).

LITERATURE

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METODA MEEK MICROGRAFTING U KIRURŠKOM LIJEČENJU OPEKLINA VISOKOG POSTOTKA

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Ključne riječi: opekline, micrograft

Sažetak. *Micrograft* je kirurška metoda liječenja opekline visokog postotka. Provodi se u operacionoj sali po svim pravilima asepsa i antiseptice. Prednosti ove metode su: potrebna je mala količina autografa (davajuće regije), svaki centimetar zdrave kože se može iskoristiti, mogućnost kombinacije sa drugim kirurškim metodama. Otoci kože se spajaju što rezultira brzom epitelizacijom. Nakon zaraštanja površina kože je glatka. Kozmetički rezultati su slični *meshgraftu* 1:3. Ekspanzija (rastezanje) kože može se postići u omjeru 1:3, 1:4, 1:6, 1:9.

1958. C. P. Meek je prezentirao kiruršku metodu micrografting u liječenju opekline visokog postotka. U suradnji sa kirurzima na odjelu za opekline u Red Cros Beverwijk, Nizozemska. Danas se micrograft koristi diljem Europe. Na odjelu za opekline, Klinike za traumatologiju Zagreb, primjenjuje se od 1997. godine.

Meek micrografting

Aparat micrograft se sastoji od 13 cirkularnih oštrica (noževa) koji režu kožu u 196 četvrtastih komadića veličine 3mm x 3mm. Noževe pokreće pneumatski motor (5–7 bara). Noževi su načinjeni od čvrstog otpornog nehrđajućeg čelika. Svi dijelovi su zasebni i mogu se prati i sterilizirati osim pneumatskog motora. Noževi su peru mekom četkicom i ne odlažu se na tvrdi površinu da se ne oštete.

Nakon kirurškog pranja i pokrivanja uzima se autograft. Autograft (davajuća regija) uzima se pomoću dermatoma koji nam omogućuje kožu jednake debljine i minimalnog krvarenja. Prije uzimanja davajuća regija ne smije biti tretirana masnim kremama. Nakon uzimanja autografa regija se prekrije vazelinom gazom ili oblogama koje sadrže sre-

bro, suhim gazama i omota elastičnim zavojem. Ako nema znakova infekcija ne dira se 14 dana.

Na tržištu postoje sterilni jednokratni setovi za micrograft koji se sastoje od pluta, nabrane svile koja je na aluminijskoj foliji. Nakon otvaranja seta pluto se potopi u fiziološku otopinu. Ovisno o naborima svile postoje veličine 1:3, 1:4, 1:6, 1:9.

Koža se reže na komadiće veličine 42 mm x 42 mm i 2 mm debljine (ne smije prelaziti okvire pluta) i stavlja se dermalnom stranom na specijalnu podlogu od pluta. Koža sa plutom se stavi ispod noževa koji pomoću pneumatskog motora prerežu kožu ali ne i pluto. Nakon prvog prolaska kroz noževe koža je narezana na 14 trakica, nakon toga se pluto uzme i zarotira za 90° i slijedi drugi prolazak kroz noževe. Tako obrađen autograft spreja se sa specijalnim ljepilom – leukosprij (epidermalna strana). Pri tome je važno ne staviti previše ljepila i sprejati na udaljenosti 15–20 cm. Ljepilo se suši pet minuta i zalijepi se na svilu i alufoliju. Pluto se lagano skida sa svile. Svila i aluminijska folija se istodobno razvlače u širinu i dužinu. Micrograft se tada stavlja na opečenu površinu na kojoj je prije toga učinjena nekrektomija i hemostaza (u slučaju hematoma autograft će