

Axillary catheter with intermittent boluses of local anaesthetic for ischaemic upper limb pain 18 h after failed rtPA thrombolysis

doi: 10.1017/S0265021507000038

EDITOR:

Regional analgesia can provide good pain relief for acute ischaemia associated with peripheral vascular disease or acute ischaemic events. Moreover, sympathetic blocks can contribute to vasodilatation and therefore support the treatment of the underlying disease. However, coagulopathy, induced by systemic or local thrombolysis, is an absolute contraindication for the placement of many continuous regional catheters [1–3]. The optimal safe window when to insert a continuous peripheral nerve catheter after discontinuation of thrombolytic therapy is unknown. We report a case of successful placement of an axillary catheter for acute ischaemic limb pain 18 h after failed thrombolytic therapy.

Case report

A 55-yr-old male patient with polycythaemia vera, treated with periodic phlebotomy and a history of lower extremity deep vein thrombosis, was admitted with acute ischaemia of all five fingers of his right hand. His international normalized ratio (INR) on admission was 2.5. His fingers were cold and painful and showed bluish discoloration. The patient was evaluated by vascular surgeons, and an angiogram (Fig. 1) that showed arterial thrombosis of the right hand and continuous recombinant tissue-type plasminogen activator (rtPA) thrombolysis was started by an indwelling catheter from the right femoral artery to the right subclavian artery.

The patient was admitted to the surgical ICU for monitoring during rtPA thrombolysis. Overnight, no significant improvement in limb perfusion could be seen and the patient underwent re-angiography on postoperative day 1. Given the amount of residual thrombosis, rtPA treatment was continued.

During the following night, the patient became disoriented after receiving a single dose of meper-

idine in addition to his morphine patient-controlled analgesia (PCA) for worsening pain in his arm. A computed tomography (CT) scan, performed at that time to exclude an acute bleeding complication, was read as normal and his neurologic status returned to baseline.

rtPA treatment was discontinued after 48 h on postoperative day 2, and the catheter was removed. A heparin infusion was titrated to a partial thromboplastin time (PTT) of approximately 70 s. Around midnight, the patient became agitated and disoriented. Another CT scan of the head was performed, which showed left cerebellum hypodensity, and the patient became more and more unresponsive. Brain magnetic resonance (MR) imaging revealed multiple infarcts involving the left cerebellum, the right cerebellum, the bilateral thalami and the left medial temporal occipital region. MR angiography showed left vertebral artery thrombosis. The patient was treated symptomatically with small doses of haloperidol for agitation, and the heparin infusion was discontinued on the neurologist's recommendation to prevent haemorrhagic transformation of the cerebellar infarcts. In the morning, the patient was still

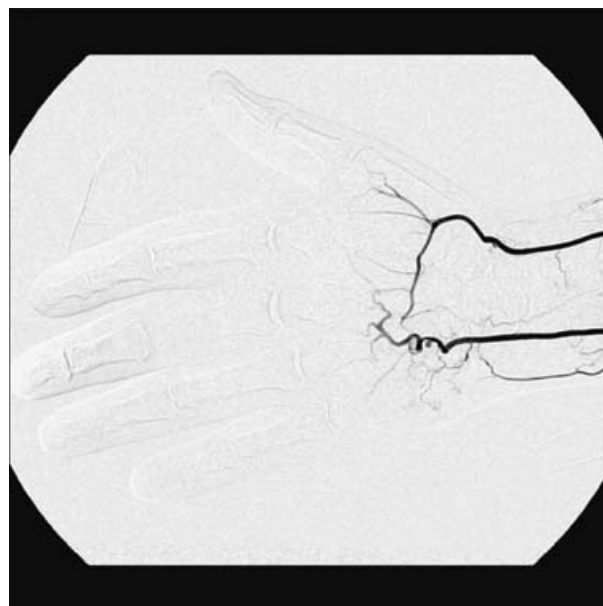


Figure 1. Angiogram showing complete occlusion of arterial supply to the right hand.

Conflict of interest: There is no conflict of interest to declare by any of the authors.

Correspondence to: Sebastian Schulz-Stübner, Department of Anesthesia, University of Iowa Hospitals and Clinics, 6JCP, 200 Hawkins Drive, Iowa City, IA 52242, USA. E-mail: sebastian-schulz-stubner@uiowa.edu; Tel: +1 319 384 5876; Fax: +1 319 3562940

Accepted for publication 2 January 2007 EJA 4116
First published online 28 February 2007

somnolent but complained about severe pain in his right arm when roused. Also, the discoloration of his fingers was slowly progressing proximally, and the distal parts were cold and numb. The patient described a burning sensation in addition to the sharp and shooting pain. Morphine PCA and systemic narcotics had been discontinued secondary to his worsened neurological status. Eighteen hours after discontinuation of rtPA and 9 h after discontinuation of the heparin infusion, his fibrinogen levels were still markedly elevated but his INR and PTT had returned to high normal values. An axillary brachial plexus catheter was placed using a stimulating catheter (Stimucath[®]; Arrow International, Reading, PA, USA), and a good motor response with hand extension and thumb adduction at 0.44 mA was elicited via the indwelling catheter after ultrasound-guided puncture and advancement of the catheter. A bolus of mepivacaine 1.5% 20 mL and ropivacaine 0.75% 20 mL were injected through the catheter and resulted in pain relief after 10 min. The skin temperature of the affected hand rose from 34.5 to 36°C, 30 min after injection of the local anaesthetic. Ultrasound guidance was used for the placement of the axillary catheter to avoid accidental puncture of the axillary artery or vein. The catheter was tunnelled to prevent dislocation, and there was mild oozing at the tunnel site but no haematoma formation.

A cerebral angiogram was performed and showed left vertebral artery thrombosis and a patent right vertebral artery. Lower extremity duplex sonography showed extensive subacute deep venous thrombosis bilaterally, and an inferior vena cava filter was placed. Transthoracic echo and tranoesophageal echo showed a small patent foramen ovale with minimal right to left shunt with valsalva manoeuvre.

Boluses of ropivacaine 0.5% 10 mL were injected into the axillary catheter every 8 h. This regimen allowed consistent pain relief and sympathetic block. Finger cyanosis improved. With improved neurological status, gabapentin 900 mg was commenced every 8 h with 325 mg of aspirin and codeine tablets. The haematologist recommended enoxaparin 100 mg subcutaneously every 12 h for the treatment of his hypercoagulable state. The axillary catheter was removed after 5 days, 1 h before his evening dose of enoxaparin. No bleeding complications were observed. His neurological status as well as the finger ischaemia continued to improve.

Discussion

This case report presents some challenges for the multi-disciplinary critical care team. It highlights

the value of regional analgesia with local anaesthetics for the treatment of ischaemic limb pain and the beneficial effects of the accompanying sympathectomy-induced vasodilatation. However, it also points out the challenge of anticoagulation management and risk assessment for placement and removal of continuous nerve block catheters in this population [4].

While for elective procedures, the recommendations made by the American Society of Regional Anesthesia [1,2] and the German Society for Anesthesia and Critical Care Medicine [3] should be strictly followed, in cases like ours, an individual risk assessment and a clinical decision after careful explanation and informed consent had to be made.

Given the pharmacologic profile of rtPA [5,6] and the urgent need for sufficient pain relief on one side and the risks involved with systemic opioid administration in the presence of a fresh ischaemic stroke on the other side, we felt rather safe to proceed with placement of an axillary catheter under ultrasound guidance [7] 18 h after discontinuation of rtPA. Garabedian and colleagues [8] reported an initial and terminal half-life of rtPA of 5.3 and 46.2 min, respectively.

With the risk of bleeding complication in mind, we chose the axillary route over the infraclavicular or cervical paravertebral route [9] because the site would be easily compressible if a bleeding complication should occur. We also felt safer because ultrasound could be used for guidance. We chose a bolus regimen for this patient in order to achieve sufficient sympathetic block via the axillary catheter and to allow neurologic examinations when the motor block was starting to wear off at the end of the 8 h period. At the time of catheter removal the patient was receiving high dose enoxaparin treatment for anticoagulation. There are no known safety intervals with this type of regimen whereas the usual recommendation for neuraxial blocks is to wait at least 11 h after doses of 30 or 40 mg of enoxaparin [10]. Because we could not stop the enoxaparin treatment, we decided to remove the catheter 12 h after administration of the morning dose immediately before administration of the evening dose, holding pressure for about 15 min after removal, of the catheter.

In conclusion, we report the successful use of an axillary catheter to provide pain relief and sympathectomy for ischaemic limb pain despite potential problems with the patient's coagulation status 18 h postthrombolysis for catheter placement and under high-dose enoxaparin treatment during catheter removal. We would not advocate such an approach in non-compressible locations, but

feel that continuous peripheral nerve blocks in compressible locations (e.g. axillary, femoral and distal sciatic blocks) can be considered for the treatment of ischaemic limb pain if other treatment options are limited, and a careful risk benefit assessment has been made taking the potential risks of anticoagulation into account.

S. Schulz-Stübner
Department of Anesthesia
University of Iowa Hospitals and Clinics
Iowa City, IA, USA

C. Martin
Department of Neurology
University of Iowa Hospitals and Clinics
Iowa City, IA, USA

References

- Horlocker TT, Wedel DJ, Benzon H *et al.* Regional anesthesia in the anticoagulated patient: defining the risks. *Reg Anesth Pain Med* 2004; 29: 1–12.
- Horlocker TT, Wedel DJ, Benzon H *et al.* Regional anesthesia in the anticoagulated patient: defining the risks (the second ASRA Consensus Conference on Neuraxial Anesthesia and Anticoagulation). *Reg Anesth Pain Med* 2003; 28: 172–197.
- Gogarten W, Van Aken H, Büttner J, Riess H, Wulf H, Buerkle H. Regional anesthesia and thromboembolism prophylaxis/anticoagulation. Revised guidelines of the German Society of Anesthesiology and Intensive Care Medicine. *Anaesth Intensiv Med* 2003; 44: 218–230.
- Schulz-Stübner S, Boezaart A, Hata JS. Regional analgesia in the critically ill. *Crit Care Med* 2005; 33: 1400–1407.
- Frey JL. Recombinant tissue plasminogen activator (rtPA) for stroke. The perspective at 8 years. *Neurologist* 2005; 11: 123–133.
- Verstraete M, Su CA, Tanswell P, Feuerer W, Collen D. Pharmacokinetics and effects on fibrinolytic and coagulation parameters of two doses of recombinant tissue-type plasminogen activator in healthy volunteers. *Thromb Haemost* 1986; 56: 1–5.
- Marhofer P, Greher M, Kapral S. Ultrasound guidance in regional anaesthesia. *Br J Anaesth* 2005; 94: 7–17.
- Garabedian HD, Gold HK, Leinbach RC, Yasuda T, Johns JA, Collen D. Dose-dependent thrombolysis, pharmacokinetics and hemostatic effects of recombinant human tissue-type plasminogen activator for coronary thrombosis. *Am J Cardiol* 1986; 58: 673–679.
- Boezaart AP. Perineural infusion of local anesthetics. *Anesthesiology* 2006; 104: 872–880.
- Horlocker TT. Thromboprophylaxis and neuraxial anesthesia. *Orthopedics* 2003; 26: s243–s249.

Anaesthesia for Caesarean section and acid aspiration prophylaxis: a survey of Slovak obstetric departments

doi: 10.1017/S0265021507000014

EDITOR:

In the US, regional anaesthesia is used in 93% of Caesarean sections [1]. A German survey from the year 2002 indicated that 73.4% of scheduled Caesarean sections and 48.2% of urgent Caesarean sections were performed using regional anaesthesia [2]. General anaesthesia carries a risk of regurgitation and aspiration of stomach contents into the lungs. In Germany, pharmacological prophylaxis of acid aspiration before elective Caesarean section was routinely used in 69% of obstetric departments in 1997 [3]. In the UK, the rate of pharmacological prophylaxis was more than 90% for scheduled Caesarean sections [4]. In Slovakia, the rate of Caesarean delivery increased from 13% in 1997 to

16.8% in 2001 [5]. In view of the increasing frequency of Caesarean sections in Slovakia, we conducted a retrospective survey to study anaesthetic techniques and aspiration prophylaxis practices in parturients undergoing Caesarean section during a 1-yr period (January to December 2005).

We surveyed all 66 obstetric departments in Slovakia using a mailed questionnaire with a cover letter inviting comments on the protocols of the respective unit. Departments that did not respond within 8 weeks were sent a reminder. Obstetric records, and information about the anaesthetic technique, acid aspiration prophylaxis and the drugs used, including dose and route of administration, were solicited. Sixty-one (92%) departments responded. Of the 52 233 deliveries in Slovakia in 2005, information from 48 744 (93.3%) was included in the survey; among those were 9383 Caesarean sections. The obstetric departments performed an average of 799 deliveries yr⁻¹ (Table 1). The overall Caesarean section rate was 20.2%. Sixty

Correspondence to: Peter Uharček, Department of Obstetrics and Gynaecology, Faculty Hospital, Špitálska 6, 949 01 Nitra, Slovakia. E-mail: uharcek@gmx.net; Tel: +421 37 6545317; Fax: +421 37 6514271

Accepted for publication 18 January 2007 EJA 4138
First published online 28 February 2007