CASE REPORT

An uncommon side effect in a common procedure: a case report of an adverse reaction to prilocaine during a Bier’s block
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Abstract
This case report describes a rare side effect during a Bier’s block. During local anaesthetic injection, the patient suffered a sudden onset painful petechial rash localised to the upper limb, distal to the tourniquet, without systemic effect. After deflation of the tourniquet, the pain resolved and no systemic effects were seen. The skin changes settled without treatment over one week. The discussion summarises standard technique and precautions required for a Bier’s block. It also evaluates risks and complications.

A Bier’s block is a commonly used technique for regional anaesthesia. It is safe and effective; however, it is not risk-free. This case demonstrates a rare side effect, exacerbated by standard precautions required during this procedure. Patient consent was granted for publication.

Case report
An 80-year-old lady presented with a 3-day-old angulated distal radius fracture. Planned treatment was manipulation under Bier’s block. Medical history included stable angina, previous local anaesthetic use during dental procedures, with no known drug allergies. No absolute contraindications to Bier’s block were present. Informed consent was gained.

The block was performed in the standard fashion. After 8 ml of 0.5% prilocaine, the patient felt proximal forearm discomfort. This was initially interpreted as pain secondary to tourniquet pressure. The injection ran freely. After 12 ml the patient felt pain in her hand and wrist. Pain increased despite cessation of prilocaine infiltration.

Skin changes with swelling and petechiae (Figure 1) became obvious. There was no evidence of extravasation of local anaesthetic.
Figure 1. Note the line of demarcation where the tourniquet was present

![Image of a line of demarcation on a arm.]

Figure 2. 24 hours after infiltration of prilocaine. Note that the purpura is not specifically concentrated around the cannula site

![Image of an arm with purpura.]
Figure 3. Patient in below elbow cast 13 days post Bier's block with prilocaine. No persistent skin changes observed.

Routine bloods were taken, IV fluids plus antihistamine (promethazine 25 mg) were commenced through the contralateral cannula, oxygen applied and a systemic review conducted. Heart rate was 92 beats per minute, blood pressure 142/86 mmHg and pulse oximetry showed an oxygen saturation of 99% on 6 litres of oxygen via a Hudson Mask. There were no immediate systemic effects of this local reaction. No further treatment was required at this time.

After 20 minutes the tourniquet was removed and the arm pain subsided. The patient suffered chest pain similar to her usual angina. This lasted three minutes and resolved without treatment. Systemic observations remained within normal limits. No electrocardiogram (ECG) changes were evident. Baseline and follow-up cardiac markers were not elevated. International Normalised Ratio (INR) was 1.1 with an activated partial thromboplastin time (APTT) of 32. The patient was monitored for 24 hours. Skin changes remained stable without blistering or necrosis (Figure 2).

No further cardiac symptoms reported. Subsequent treatment of the fracture was a below elbow non-moulded plaster of Paris cast and regular review over the following week. No further adverse events were noted. Two weeks later the skin changes (Figure 3) had completely resolved, without evidence of further complications.

Given the speed of onset, our clinical findings suggested an anaphylactoid reaction to prilocaine which is a rare but significant complication. Few cases have been reported in the literature. A serum tryptase, a marker of mast cell activation, may have been useful to confirm or refute this theory.

Discussion

A Bier’s block should be performed with blood pressure and cardiac monitoring. Local anaesthesia is inserted into a cannula placed as distally as possible in the affected extremity, with a larger ‘safety’ cannula in the contralateral antecubital fossa. An appropriately padded tourniquet is placed proximally on the injured arm and the limb exsanguinated to increase concentration of the anaesthesia. The tourniquet should be inflated to 100 mmHg greater than systolic blood pressure. Prilocaine is most commonly used (0.5 mg/kg) via slow injection, utilising a large syringe. Patients commonly feel discomfort around the tourniquet site, note mottling or a hot flush in the lower
arm. The planned procedure may commence after five minutes. The tourniquet must remain inflated for a minimum of 20 minutes for adequate metabolism of local anaesthetic and to minimise systemic absorption. Then, the tourniquet can be slowly deflated, with monitoring continued for 10 minutes.

A wide variety of complications from Bier’s blocks have been reported. Anaphylaxis is possible with any medication. Prilocaine has a low risk of anaphylaxis. Bupivacaine is contraindicated, as it has a higher risk of cardiotoxicity.

Localised nerve damage, extravasation of local anaesthetic and compartment syndrome are all possible early sequelae. Methemoglobinemia is a condition characterised by an altered haemoglobin molecule being present in the blood at a concentration greater than one percent. It has been associated with local anaesthetic use. Increasing concentrations may lead to shortness of breath, cyanosis and mental status changes. Greater concentrations can cause cardiac dysrhythmias and death. Severe cases require treatment with methylene blue or hyperbaric oxygen.

Following premature deflation of the tourniquet, or with an inadequately inflated device, systemic absorption of local anaesthesia can occur. Patients may complain of nausea, tinnitus or perioral tingling, and progress to vomiting, muscle twitching, loss of consciousness, or convulsions. In severe cases, ECG changes of prolonged PR, QRS, and QT intervals may occur. This may progress to cardiac arrest.

Toxicity is typically short-lived and treated with airway protection and resuscitation if required, however, inotropes increase survival rates. Local anaesthetics are lipid soluble, therefore in prolonged cardiovascular collapse, treatment with a lipid emulsion can relieve the effects of local anaesthetics on myocytes and increase survival.

It is our conclusion that a prilocaine Bier’s block remains a relatively safe procedure, but (as during any procedure) vigilance is mandatory.

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References

