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Case Report

Internal Medicine Section

Purple Glove Syndrome- A Catastrophic Complication of Phenytoin Injection

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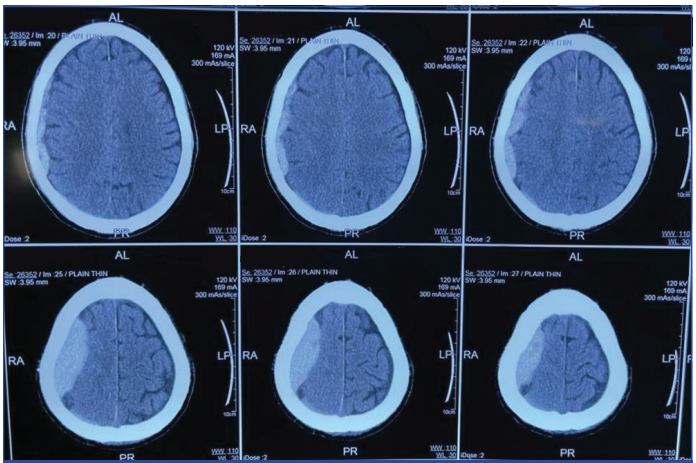
ABSTRACT

Purple Glove Syndrome (PGS) is a rare complication of intravenous phenytoin administration, which is illustrated by delayed soft tissue injury of the skin conterminous to the point or distal to the site of intravenous phenytoin infusion. The clinical features of PGS include pain, oedema, and bluish discolouration over the extremity. The present case report describes about a 60-year-old male, who presented to the Emergency Department with the chief complaints of generalised tonic clonic seizures, lasting for 10 minutes, for which he was managed with inj. phenytoin sodium. The computed tomography scan of brain revealed right-sided subdural haematoma. After 24 hours of hospital stay, the patient started complaining of severe pain in the arm and forearm. There was purple-bluish discolouration around the intravenous site, peripheral oedema and pain. The various risk factors linked to PGS, include old age and large and multiple doses of phenytoin.

Keywords: Peripheral oedema, Subdural haematoma, Tonic clonic seizures

CASE REPORT

A 60-year-old male came to the Emergency Department, with generalised tonic-clonic seizures 15 minutes back, lasting for approximately 10 minutes, and associated with up rolling of eyes along with frothing from mouth and loss of consciousness. In the Emergency Department, the patient was stuporous with Glasgow Coma Scale (GCS)- E3V4M6. He was immediately treated with intravenous (i.v.) lorazepam 5 mg, followed by i.v. 1 gram of phenytoin sodium dissolved in 100 mL of sterile saline which was administered into the right forearm over 30 minutes. The seizures stopped after receiving the drug and he was admitted to the Medicine Intensive Care Unit (ICU) for monitoring. A Computed Tomography (CT) scan of the head was done to rule out the organic cause of seizure, which revealed subdural haematoma in the right side of the brain [Table/Fig-1].



[Table/Fig-1]: Computed Tomography (CT) scan showing subdural haematoma in the right side of brain.

On examination, the pulse rate of 90 beats per minute, blood pressure was 110/60 mmHg, and saturation was 98% in room air. Both tone and reflexes of her upper and lower limbs were normal and muscle power of grade 5 with bilateral plantar flexors. The rest of the systemic examination was normal. Patient also had polydactyly on right hand near the proximal phalanges of index finger.

The initial laboratory results revealed that haemoglobin was 10.4 g/dL, Mean Corpuscular Volume (MCV) was 98.3 fL, White Blood Cell (WBC) count was 9000 cells/µL, platelet count was 2.12×10^9/L, serum urea was 60, serum sodium was 126 mmol/L, serum potassium was 3.8 mmol/L, serum creatinine was 33 mg/dL, and normal liver function tests. Blood sugar level were within normal range.

During first four hours following admission, the patient had lethargy, malaise. Then, he started complaining of severe pain in the right hand and forearm. On examination, it revealed bluish discolouration of the distal aspects of index, middle and ring fingers of right hand [Table/Fig-2]. The peripheral pulses were feeble on palpation. Duplex ultrasound of the right upper limb was done and showed normal flow. Purple glove syndrome was suspected.

[Table/Fig-2]: Purple discolouration of the fingers (and poldactyly).

The patient was given intramuscular diclofenac injection for relief of pain. The arm was elevated and gentle dry heat was given. The bluish discoloration showed improvement on the 3rd day. The Naranjo adverse drug reaction probability scale score was 10. Operative management for subdural haematoma was planned and was discharged via a thorn hole. On post-treatment examination, the patient was in an excellent condition. The patient was released on oral levetiracetam 500 mg twice day. On follow-up, he was doing well. In the present case, extravasation of phenytoin injection was suspected to be the culprit for development of purple glove syndrome. Then patient was discharged on day 7.

DISCUSSION

The Purple Glove Syndrome (PGS) is an uncommon phenytoin i.v. complication characterised by delayed soft tissue injury of the

skin close to the intravenous phenytoin infusion site [1,2]. The PGS can occur with or without i.v. phenytoin extravasation [3]. Pain, oedema, and purple-blue staining of skin tissue next to the i.v. phenytoin infusion site are all symptoms of PGS [3]. In terms of clinical development, PGS has three stages. A dark purple-bluish discolouration of the skin arises at the site of i.v. phenytoin infusion during the first stage, which occurs within 2-12 hours following infusion of i.v. phenytoin [1]. Oedema develops in the second stage, which takes place over the next 12-16 hours, and the dark purple-bluish colouring around the infusion site progresses [3,4]. Healing occurs during the later phases of PGS, when oedema disappears and skin tissue discolouration fades. The PGS has been reported as agonising throughout its progression [2]. The likely prevalence of PGS following i.v. administration of phenytoin varies from 1.7-7% [5]. Advanced age, arterial circulation, and the arrangement of the i.v. cannula are all predisposing factors for the syndrome. PGS occurs when phenytoin crystallises with blood and subsequently extravasates into the interstitial space [6]. The other plausible theory is that phenytoin leaks into the soft tissue through the disrupted endothelial-intercellular junctions and causes PGS [6]. Cases that are not severe usually heal with conservative management like elevation, dry heat application. Severe cases with compartment syndrome, require fasciotomy [4]. The present case highlighted a catastrophic sequel of i.v. phenytoin organisation. The pharmacoeconomic study of fosphenytoin and phenytoin focused on the trade-off between fosphenytoin's higher initial costs and the higher treatment costs owing to PGS with phenytoin. True prospective incidence data, which were required for the present pharmacoeconomic study, had not been gathered. According to some reports, PGS risk is higher in women and the elderly. Peripheral vascular disease, illnesses that impair vascular and dermal integrity, the use of i.v. catheters smaller than 20 G, and phenytoin infusions at doses greater than 25 mg/mL are additional risk factors [7,8]. The old age group, female gender, usage of a 22 G cannula to give phenytoin, as well as the rate of infusion, were all risk factors, in the index patient. Phenytoin should be administered into a free-flowing infusion line, through a large bore i.v. catheter inserted into a big vein of the forearm, at a rate of no more than 50 mg/min, in a concentration of 10 mg/mL [9]. Dextrose solutions and lactated ringers solutions cannot be used with i.v. phenytoin due to the possibility of precipitation, and it should be diluted in 0.9% normal saline solution. The infusion should be stopped right away, and the i.v. catheter should be removed, if there is any indication of venous irritation, such as pain, oedema, or erythema [7]. The treatment is conservative (limb elevation, physiotherapy, pain management, patient reassurance) and should aim to reduce the extent of soft tissue injury [10]. Blood pressure readings or venipuncture should not be performed on the affected arm. Nitroglycerine patch and intravenous heparin administration are two medical therapy strategies for PGS. The anaesthesiologist's role in this case can be either pain management or a conclusive surgical procedure like a fasciotomy or amputation. The PGS hurts a lot because of ischaemia and tissue damage. The pain can be reduced using a low dosage of local anaesthetic, by preferentially blocking the A and B fibres [11,12]. By blocking the brachial plexus with a local anaesthetic like ropivacaine, this can also be accomplished. Fentanyl is used to increase the local anaesthetic effect through central opioid receptor mediated analgesia and peripheral fentanyl uptake into the systemic circulation [13,14].

CONCLUSION(S)

Purple glove syndrome is a unique phenytoin intravenous (i.v.) complication which involves delayed soft tissue loss around the intravenous phenytoin infusion site. Careful handling of such drugs can prevent further more complications. Early diagnosis of such condition, can lead to early treatment.

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