

Introduction

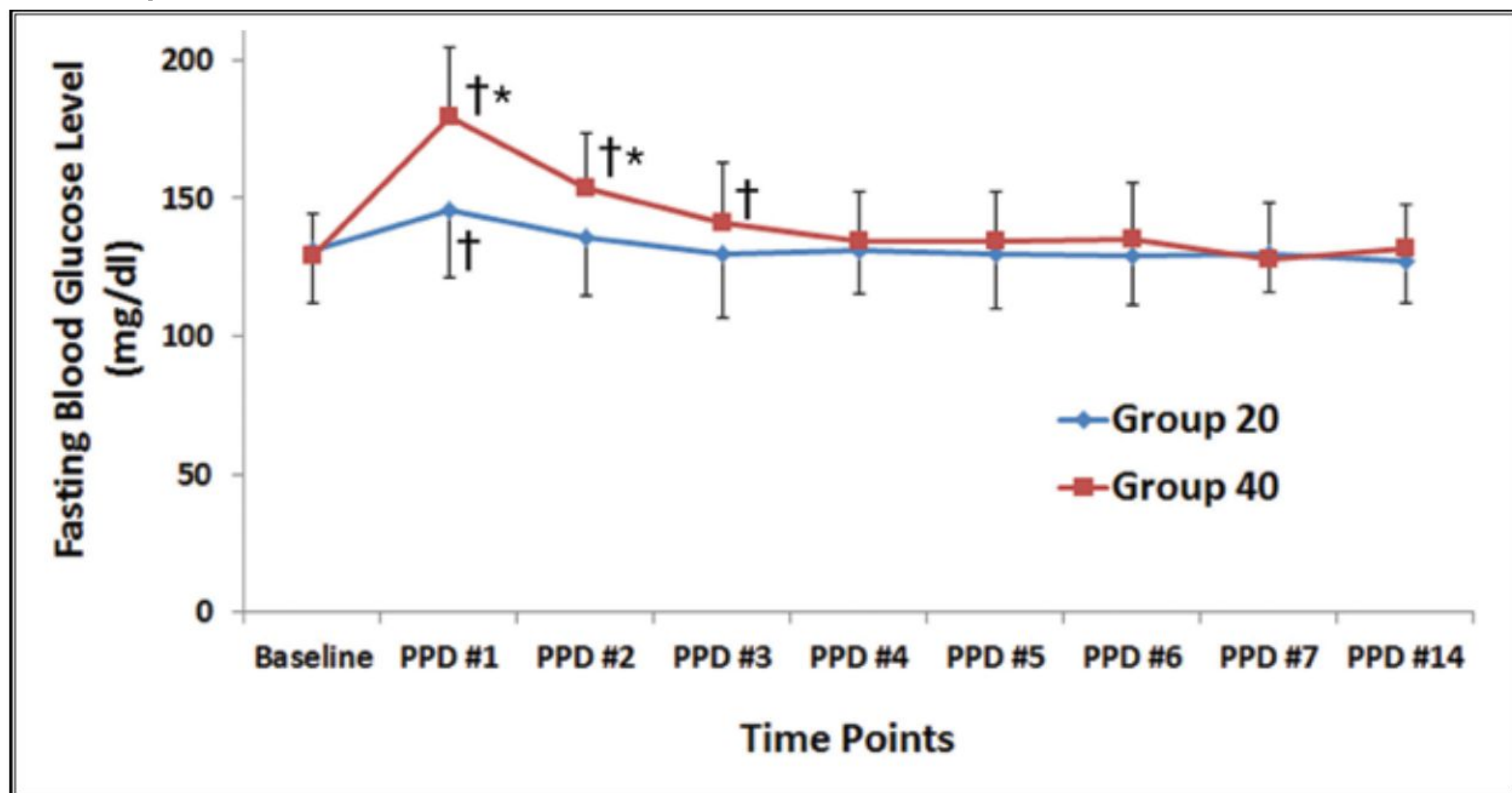
The treatment of cervical radiculitis in the comorbid patient presents several potential challenges. As the prevalence of back and neck pain increases, so do complicating comorbidities such as diabetes mellitus. As these patients require more treatment for radicular pain, the potential side effects of these treatments is an important consideration. One such complicated issue is the optimization of corticosteroid dosage. Corticosteroids are thought to be effective in many ways. This includes a general anti-inflammatory effect, as well as inhibition of ectopic neural discharges, nociceptive C-fiber blockade, and the inhibition of cytokine synthesis and activity. However, the potential drawbacks include potential adrenal insufficiency, Cushing syndrome, osteoporosis, as well as hypertension and hyperglycemia.(1) We present a case of diabetic ketoacidosis that developed after a cervical epidural steroid injection.



Case

A 76 year old female with a past medical history of cervical stenosis, bilateral knee osteoarthritis, and diabetes mellitus presented to our outpatient clinic for a cervical epidural steroid injection. She had previously had steroid injections to her bilateral knees at an outside clinic, without complications. A C7-T1 cervical epidural steroid injection was performed under fluoroscopic guidance. Lidocaine 1% was used for skin infiltration, iohexol 250 mg iodine/ml injection was used to confirm epidural placement, and 40 mg triamcinolone was injected into the epidural space. Loss of resistance was found at 8 cm. The patient was discharged without incident. She then presented to our emergency department 11 days later, with frequent urination, increased thirst and fatigue, with a measured home blood glucose of 541.

On arrival at the emergency department, she was mildly tachycardic, but otherwise vital signs were stable. An initial blood glucose was measured at 565, with hyponatremia (sodium 129), low bicarbonate (18), elevated creatinine (1.48) and an elevated anion gap of 14. She additionally had an elevated beta hydroxybutyrate. The patient then began treatment for diabetic ketoacidosis with intravenous fluids and subcutaneous insulin, and was admitted. Her A1C at the time was 13.9. Her A1C previously had been quite well controlled, at 6.0 the year before. She was then admitted for a total of 7 days, and her anion gap closed after only one day of treatment. She was eventually discharged home, with an increased insulin regimen, and planned follow up.



Discussion

The utility of steroids in epidural injections has been well established. The associated pain relief is thought to be from leukocyte stabilization, macrophage inhibition, reduced complement, reduced fibroblast proliferation and histamine antagonism. Conversely, the potential side effects include Cushing syndrome, adrenal insufficiency, HPA axis suppression and osteoporosis. Hyperglycemia is also a well known side effect of exogenous glucocorticoids. This is a direct result of corticosteroids causing increased gluconeogenesis and glycogenolysis, as well as increased insulin resistance. Initial studies regarding hyperglycemia after epidural steroid had shown increased fasting and post-prandial blood glucose 2-7 days post-injection. Post injection levels can be as high as 500 mg/dL(2). If a diabetic patient is to get a neuraxial steroid injection, then minimum effective dose bears discussion. For interlaminar lumbar epidurals, 40 mg methylprednisolone is as effective as 80 mg. For transforaminal lumbar epidurals, 4 mg dexamethasone is as effective as 12 mg. This is in contrast to a survey performed by Vedra Et Al in 2019. Of 314 physicians surveyed, for a single cervical or lumbar injection, 56% used 10 mg dexamethasone, 17% used more than 10 mg and 6% used 20 mg per injection level. Unsurprisingly there are few studies analyzing effective dosages for cervical interlaminar epidurals, which can explain the wide variety of practice patterns shown(3)(4). Regarding our patient, she was several days outside of this window at 11 days post injection. Additionally, she received 40 mg triamcinolone, which is equivalent to 7.5 mg dexamethasone, between the standard dosing and minimum effective dosing for interlaminar epidurals. It is less likely that the cervical epidural steroid injection was a substantial precipitating factor. However, as previously mentioned, the aforementioned data is also more specifically applicable to lumbar and caudal injections, and requires further investigation.

Conclusions

In the case of epidural steroid injections with diabetic patients, judicious dosing should be used for epidural steroids: 40 mg methylprednisolone versus 10 mg dexamethasone (ideally less). More evidence is also necessary regarding the ideal dosage for cervical epidural steroids.

References

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