Sub Anaesthetic Intravenous Propofol Infusions In A Patient With Severe Refractory Chronic Headache.

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Abstract

Background
Migraine headache, refractory to conventional treatments is a big and costly problem for Emergency Departments, Neurology, Pain Clinics and Society. Although there have been case reports describing complete resolution from a propofol treatment, the dosing regimens and place in the treatment algorithm are not established.

Objective(s)
To report the effectiveness and increase the available literature of sub anaesthetic propofol infusions in the treatment of migraine.

Method
We report the case of a lady with refractory severe migraine headache with medication overuse requiring frequent hospital admissions and being considered for a trial of occipital nerve stimulation. She had failed to respond to multiple oral medications, intravenous dihydroergotamine, lignocaine, ketamine and magnesium sulphate.

Results
She obtained 3 months complete relief from the first 'sub-anaesthetic sedating dose' of intravenous propofol infusion over thirty minutes, no improvement from a 2nd similar treatment with the same dose of propofol that was not sedating and sustained complete relief from the third and last infusion of a bigger dose that was again 'sub-anaesthetic and sedating'.

Conclusion
Although the use of 'subanaesthetic' intravenous propofol to abort headache has been reported, this report describes the successful long term use of propofol 'sub-anaesthetic sedation' in a patient with complete resolution of a severe headache refractory to conventional treatment. This case and reports indicate 'sub-anaesthetic' propofol infusions are safe and potentially very effective treatments when administered in a monitored environment by anaesthetists and should be tried before consigning the patient to 'living' with the headache or other more expensive treatments.

Case

- Our patient was a 44 year old lady with a complex past history of antiphospholipid syndrome with previous multiple pulmonary emboli and deep venous thromboses for which she was on warfarin. Other significant co-morbidities included asthma, chronic obstructive lung disease, depression, bipolar disorder, polycystic ovarian syndrome and hypothyroidism. She was morbidly obese and weighed 150kg. She was a chronic smoker.
- In the preceding eighteen months there had been multiple admissions under the Neurology Unit for refractory severe predominantly right sided, periorbital and occipito-frontal headaches. The headaches were rated 7/10 at rest and 9/10 with activity.
- She was diagnosed with transforming migraine and chronic daily headache (medication overuse). Her headaches were associated with nausea, vomiting, paraesthesia and photophobia.
- Vital signs were normal. She had no focal neurology, cervical, occipital or frontal tenderness.
- Medication for her headache included: oxycodone 5mg qid, gabapentin 300mg tds, zolmitriptan 2.5mg prn, paracetamol 1g qid, metoclopramide 10mg bd and clonidine 100ug tds.
- Concomitant medications included mirtazepine 30mg nocte, venlafaxine 300mg mane, lithium carbonate XR 675mg, quetiapine 200mg mane, 600mg nocte, pantoprazole 40mg mane, simvastatin 20mg nocte, tiotropium 18mcg daily, thyroxin 50mcg mane, salbutamol prn, varenicline 1mg daily, ondansetron 4mg tds prn,

Past Headache Treatments

Her headaches had not responded to adequate trials of topiramate, diazepam, metoclopramide, tramadol, paracetamol & codeine, mexiletine, sumatriptan, dihydroergotamine, chlorpromazine or sodium valproate .

Non steroidal anti-inflammatory agents were contraindicated by the risk of precipitating lithium toxicity.

She had obtained no lasting relief from multiple lignocaine infusions using the Richard Stark protocol.

She obtained no lasting relief beyond 3 weeks from multiple 5 day ketamine infusions that were now unacceptable because of unpleasant hallucinations.

An intravenous magnesium sulphate infusion (120mmol given at 4 mmol per hour) over 30 hours had also been ineffective.

Sub-anaesthetic Propofol Infusion Technique

Sub-anaesthetic propofol infusions are administered by an anaesthetist using a syringe pump over 30 minutes in a monitored recovery room bed with the patient in the left lateral position, receiving oxygen by face mask.

The patient is lightly sedated, does not require or tolerate an oral airway and is rousable to gentle stimulation

1st Propofol Infusion Treatment

The first treatment with 200mg of propofol administered over 30 minutes (400mg/hour) produced a sub-anaesthetic state.
Outcome: She reported an immediate 50% reduction of pain intensity to 4/10 in recovery and she woke up pain free and was discharged the following day after 22 days in hospital for treatment resistant refractory migraine. She was pain free for 46 days after this treatment.

Progress & 2nd Propofol Treatment

The headache then slowly returned to baseline over the next 28 days and readmitted to hospital with severe bilateral occipito-frontal headache rated 9/10, associated with low grade background headache, 2 weeks of left sided numbness, nausea and photophobia.
Vital signs were normal, she had no weakness, neck stiffness, fever or cervical tenderness.
Oxycodone 5mg qid reduced her headache to 7-8/10. The gabapentin was increased to 600mg and then 900mg tds without benefit; caused dizziness and was weaned.

Using the same infusion technique from the previous admission, 200mg propofol was infused over 30 minutes (400mg/hour).

This time the patient was restless, chatty and was not sedated, did not obtain pain relief and could not be discharged.

She remained in hospital for the next 7 days, with headache intensity rated 7/10.

3rd Propofol Infusion Treatment

A third propofol infusion was performed using the same technique with the aim of achieving light sedation.

She remained restless, chatty and awake during the first 200mg propofol infused over 30 minutes and did not obtain any pain relief.

The propofol infusion was then increased at 5 minute intervals by 100mg/hour increments to a maximum rate of 800mg/h at which stage she became sleepy, snored gently, stopped talking but remained rousable. A total of 600mg propofol was administered over 60 minutes.

Her headache was rated 3/10 at discharge from recovery and 0/10 the following day when she was discharged from hospital after a 12 day admission.

She is still pain free and has not been readmitted with headache 3 years after this 3rd treatment.

Discussion

The use of intravenous propofol for treatment of medication resistant migraine was first reported in the literature by Krusz et al in 2000. They reported the use of sub anaesthetic doses of intravenous propofol in the treatment of 77 patients with intractable migraine of whom 63 had complete abolition of their migraine. Average propofol dose was 110mg over 20-30 minutes and the average decrease in pain was 95.4%.

The use of bolus propofol (1mg/kg) by an anaesthetist was reported by Drummond-Lewis and Scher in 2002. They described partial relief that enabled discharge of two patients who were asleep/anaesthesised and had depressed airway reflexes. In one case a BIS monitor (Aspect Medical, 1 Upland Road, Norwood, MA, 02062, USA) fell to 40 during the propofol administration.

In 2006 Mendes et al reported 18 patients with refractory chronic daily headaches. These patients were treated with intravenous propofol of 20-30mg every five minutes up to 400mg. The average dose administered was 234mg. They noted that patients who became drowsy or who went to sleep had better pain relief in their study. In this study drowsiness was expected. More than half of the patients (52.4%) reported a decrease in pain of 50% or more at the end of the study; 28.6% of Patients reported full relief of their pain. One patient reported no pain relief after 200mg.

Bloomstone 2007 described a patient on maximal antimigraine therapy with status migrainous who became pain free after 110mg propofol and was discharge d5 hours post treatment after a 5 day admission.

This report is noteworthy because it demonstrated sub-anaesthetic propofol infusions that produced light sedation were effective in a case refractory to maximal conventional treatment, intravenous ligncaine, magnesium sulphate, ketamine and a non-sedating propofol infusion.

Conclusions

We believe that this case demonstrates a role for sub anaesthetic intravenous propofol infusions in patients with severe refractory headache if there is lack of success with conventional oral and intravenous medications.

This case also shows while improvement may be temporary, long term relief may be obtained from treatments that achieve sedation.

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