INTRAOPERATIVE INTRAVENOUS LIDOCAINE INFUSION: CASE REPORT FOR TREATMENT OF PEDIATRIC POSTOPERATIVE PAIN

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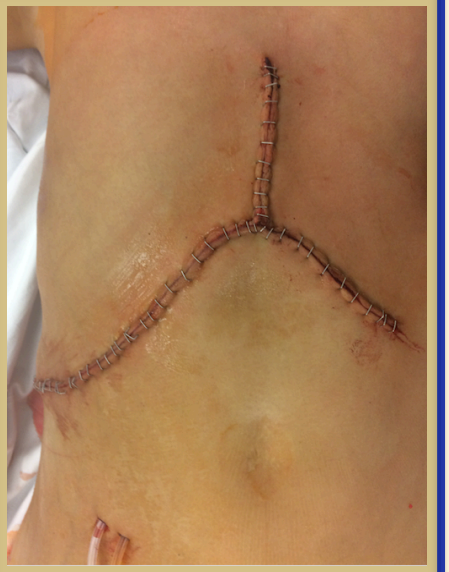
SUMMARY:

We present the use of intravenous (IV) lidocaine infusion, as a supplement for analgesia in a pediatric patient undergoing a portosystemic shunt and splenectomy

CASE REPORT

- 13 year-old, 50kg boy
- History of frequent episodes of severe bleeding, secondary to portal hypertension due to extrahepatic portal venous thrombosis
- Large midline incision
- Preoperative studies revealed an otherwise normal liver biopsy, but platelets of 49,000/mm^3
- After IV induction of general anesthesia gave:
  - Bolus of 2mg/kg of 1% Lidocaine, followed by infusion of 2mg/kg/hr
  - Bolus of 1mg/kg of ketamine followed by an infusion of 0.1mg/kg/hr
- Sevoflurane in air/oxygen used for maintenance
- Additional intra-op analgesia with 3mcg/kg of fentanyl
- No cardiac dysrhythmias or episodes of hypotension
- Two plasma lidocaine levels were measured:
  - Right after the start of the infusion **- 2.4mg/ml**
  - 7 hours later prior to extubation – **4.1mg/ml**
- Extubation uneventful and patient transported to PICU
- Postoperative analgesia with hydromorphone patient-controlled analgesia (5 mcg/kg/hr) and ketamine infusion (0.1 mg/kg/hr)
- Patient moved from the PICU to floor postoperative day 1
- Numerical pain scores less than 2 and overall minimal opioid consumption



REFERENCES

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DISCUSSION

Pain after surgery is a major concern for patients and their families. In our case, regional anesthesia was contraindicated secondary to thrombocytopenia, limiting options for postoperative pain control. IV lidocaine infusion has shown promise for adult perioperative pain management. It demonstrates significant analgesic, anti-hyperalgesia and anti-inflammatory properties while reducing nausea and ileus duration. Although the exact mechanism is unclear, it is likely due to the decreased need for opioids. Although unknown for pediatric patients, in adults the accepted dosage for analgesia in the perioperative period is an initial bolus of 1-2mg/kg followed by a continuous infusion of 0.5-3mg/kg/hr of IV lidocaine. Plasma levels of lidocaine rapidly decrease after discontinuation of prolonged infusions, with the context-sensitive half-time of a 3-day infusion being around 20 to 40 minutes.

Especially in pediatrics, where studies are limited and patients are unlikely to report early symptoms of toxicity, monitoring plasma lidocaine is important to ensure concentrations are below the toxic level of 5mg/ml. Lidocaine has a high hepatic extraction ratio, with its metabolism depending on both hepatic metabolic capacity and hepatic blood flow. In our patient, the second plasma lidocaine value was below the toxic level, but higher than expected. We believe this was a result of liver manipulation during surgery and subsequent elevated transaminases, which were normal preoperatively. We observed reduction in pain and opioid consumption in the immediate postoperative period, although unable to continue the infusion postoperatively. Interestingly, in multiple trials, the analgesic and clinical effects have been shown to exceed the duration by over 8 hours, which is more than 5 times its half-life.

Our case report highlights the need for additional studies of IV lidocaine in the pediatric population.