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Continuous Intravenous Infusion of Omeprazole in the Management of an Upper Gastrointestinal Bleed in an Infant

CS Ashtekar, H Vyas, R J Stewart, C Newman
Paediatric Intensive Care Unit, University Hospital Nottingham

Corresponding Author
Dr H Vyas, Paediatric Intensive Care Unit, University Hospital Nottingham, Queen's Medical Centre, Nottingham, NG7 2UH, UK EMail: harish.vyas@mail.qmcuh-tr.trent.nhs.uk

We report a 3 month old infant who presented with an upper gastrointestinal bleed. His bleeding was controlled initially with a continuous intravenous infusion of omeprazole. The child ultimately needed surgery 72 hours after starting intravenous omeprazole, as there was a small bleeding vessel at the base of a duodenal ulcer.

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Introduction

Newborn infants treated in the intensive care units have a high frequency of stress induced gastric hemorrhage (20%) and gastric lesions (53%)[1]. Traditionally, intravenous ranitidine is used in the treatment of any gastrointestinal haemorrhage. In severe and unresponsive cases oral omeprazole has been used.

Omeprazole injection is not licensed for use in children[2] as experience is limited and to our knowledge there has been no report of continuous intravenous infusion in children. We report the use of omeprazole as a continuous infusion in the management of a severe upper gastrointestinal bleed in an infant.

Case Report

A 3 month old baby boy was referred with a history of intermittent vomiting for the previous 6 weeks and failure to thrive. A barium meal done at the referring hospital showed a small sliding hiatus hernia and free gastro-oesophageal reflux with reflux oesophagitis.

He was born prematurely (28 weeks) by emergency caesarean section for pre-eclampsia and required medical management of respiratory distress, necrotising enterocolitis and persistent ductus arteriosus plus surgery for a right inguinal hernia.

He was admitted to the paediatric intensive care unit following an acute episode of haematemesis and melaena. On admission his haemoglobin was 3.4 g/dl, international normalised ratio (INR) 1.55 (normal range 0.8 – 1.2) and activated partial thromboplastin time (APTT) ratio of 1.02 (normal range 0.84 – 1.16). Electrolytes and liver function tests were within normal limits. He was given a blood transfusion and was also started on intravenous ranitidine (1 mg/kg four times a day). After a period of stabilisation he was taken to theatre for insertion of a central line and an oesophago-gastro-duodenoscopy, which showed oesophagitis, with two small healing lesions in the antrum of the stomach and no blood. It was difficult to visualise the duodenum because of the small size of the child and therefore a gastrotomy and duodenoscopy were performed. There was no focal lesion seen either in the duodenum or the ileum. A Nissen's fundoplication was performed and the child transferred to paediatric intensive care.

Twenty four hours later he was noticed to have fresh blood in his nasogastric tube with melaena while he was on the maximum dose of ranitidine (1 mg/kg four times a day) and sucralfate (250 mg six times a day). He was therefore started on omeprazole (Astra Zeneca) via his nasogastric tube at 1 mg/kg/day initially and increased to 3 mg/kg/day. He continued to have melaena and fresh blood from his nasogastric tube while on omeprazole for 36 hours.

In view of the exceptional circumstances, a continuous intravenous infusion of omeprazole at 150 microg/kg/hour was commenced (using the Losec® "infusion" injection preparation, replacing the syringe every 12 hours). Using a surface area of 0.2 m^2 for this 2.6 kg child the total dose over 24 hours was approximately 80 mg/1.73 m^2. A loading dose of omeprazole as suggested in adult studies[3] was not considered due to lack of available data in children.

The bleed was controlled 6 hours after starting omeprazole infusion and the gastric aspirate pH was maintained >5. A gastric pH was not checked before starting omeprazole. Following two more days of intravenous omeprazole it was changed to oral therapy at 3 mg/kg/day. Bleeding restarted within a few hours of stopping the infusion. The infusion was therefore restarted at double the original dose, i.e. 300 microg/kg/hour (equating to approximately 160 mg/1.73 m^2 per day). This higher than previously reported total daily dose[4] was undertaken in a bid to stop the rebleed knowing that the intravenous formulation has been reported to be well tolerated in severe peptic disease in children, after being used for several weeks with no adverse reactions reported[5, 6]. Further investigations including immunoglobulins and RAST for cow's milk protein were normal.

The bleeding ceased over the next few hours. Unfortunately he had a further large bleed and his haemoglobin dropped to 6.9 g/dl. Following resuscitation a second laparotomy was performed and a bleeding duodenal ulcer was found in the posterior wall of the first part of the duodenum wall. This was corrected surgically. The dose of omeprazole was decreased to 150 microg/kg/hour post operatively and converted to oral therapy after three days. He remained well on oral omeprazole and at discharge he was feeding normally and gaining weight.

Discussion

Omeprazole, a proton pump inhibitor suppresses gastric acid secretion by acting selectively on the H^+ K^+ pump of the gastric mucosa. In a previous study omeprazole was used for the treatment of peptic ulcer disease in pregnancy from conception and continued uninterrupted until delivery[7]. No side effects or malformations were observed in the newborns and follow up of these children between 2 and 12 years showed normal development.

Intravenous omeprazole is effective and well tolerated in severe ranitidine resistant peptic disease in children[5] and has previously been given to children at doses of 18 – 70 mg/1.73 m^2 12 hourly[4]. A dose of 40 mg/1.73 m^2 is required to maintain gastric pH above 4[6]. Agranulocytosis, haemolytic anaemia, rash, jaundice, elevated serum creatinine and serum transaminase are some of the adverse reactions that can occur. However, in one child no adverse effects were reported even after 3 years of continuous treatment[8]. A continuous infusion was preferred to separate injections as a recent trial in adults showed that after endoscopic treatment of peptic ulcers, a high dose infusion of omeprazole reduced the rate of recurrent bleeding and shortened the length of hospitalisation[3]. Our case demonstrates the safety and value of omeprazole in the management of acute gastrointestinal bleeding in an infant. The need to always consider whether surgery is required was highlighted by the second major bleed.

Conclusion

Omeprazole can play a useful role in the medical management of acute gastrointestinal bleeding in an infant alongside the need for surgery where necessary.

References

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