Blue Urine Following Chromopertubation: Don't Overlook!!!

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ABSTRACT

Introduction: Methylene blue has been widely used for a number of medical and surgical indications. In gynaecology it is mainly used to check integrity of bladder during surgery and the patency of fallopian tubes.

Case report: Here we report a case of bilateral ovarian cyst with secondary infertility undergoing laparoscopic bilateral ovarian cystectomy and chromopertubation using methylene blue. Post operatively the patient had aqua blue colour urine denoting milder form of methaemoglobinemia while the vitals remained stable.

Conclusion: Anticipation and early recognition can prevent fatal complications. The possible complications of methylene blue should be borne in mind whenever chromopertubating a patient of infertility.

Keywords: Laparoscopy, chromopertubation, Methhaemoglo-Binuria, Blue Urine, Infertility.

INTRODUCTION

Methylene blue has been a standard agent in clinical medicine for the past 100 years. More commonly it is used as a marker for tracing fistulae and other aberrant tracts, to check integrity of bladder during surgery and the patency of fallopian tubes.[1,2] Its medical uses are as a treatment for methemoglobinemia and as an antidote for cyanide poisoning. Paradoxically methylene blue itself can cause methaemoglobinemia when used in high concentrations. And it must be remembered that it is a "drug" and like any other drug should be administered with due regards for proper dosage and potential side effects, as this case report will highlight.

CASE REPORT

A 34 year old lady, Para1 Live1 with secondary infertility, reported to the Department of Endogynecology, Gem Institute and Research Centre, was planned for Laparoscopic chromopertubation under general anaesthesia. Intra operatively 6x6cm cyst was noted in left ovary and 2x2cm cyst in right ovary for which bilateral cystectomy was done. Chromopertubation was done using methylene blue. It was available in a 10ml ampoule where 1ml contained 10mg of 1% methylene blue. A total of 50 mg of methylene blue was used in a concentration of 0.5mg/ml. Bilateral free spill was noted. Recovery from general anaesthesia was uneventful. During post op rounds, patient was found to have aqua blue coloured urine and an examination performed at the time revealed a pulse rate of 80/minute, blood pressure of 120/80mmHg and pulse oximeter saturation of 98%. Arterial blood gas analysis was done and was normal. Following which oxygen was administered, strict input/output chart was maintained and patient was kept under careful observation. Her vitals remained stable and the colour of urine became clear on post operative day 1. Since the patient was clinically stable and the colour of urine reverted back, no active intervention was required. Patient was discharged on post operative day 2 and no complaints on follow up.

DISCUSSION

Methylene blue is 3, 9- bisdimethyl amino phenazothionium or tetramethylthionine chloride. Its uses are based on its tissue staining properties and its oxidation reduction functions. In low concentrations, its reduced form appears to increase the speed of the reversal of methemoglobin to haemoglobin. Paradoxically, in high concentrations, methylene blue oxidizes the ferrous iron of reduced haemoglobin to the ferric state, thus changing haemoglobin to methemoglobin.[1] This apparent paradoxical effect of methylene blue suggest an equilibrium between the ability of methylene blue to oxidize haemoglobin directly to methemoglobin and the ability of methylene blue to reduce methemoglobin to haemoglobin.

Methemoglobin cannot carry oxygen and when present in excess, results in a functional anemia. It also shifts the oxygen dissociation curve to the left, limiting the release of oxygen to tissues.[2] Symptoms are due to hypoxia and anaerobic metabolism.

The diagnosis is confirmed by measuring the methemoglobin levels by co-oximetry (photospectrometry).[3] The pulse oximeter readings in methemoglobinemia may not be accurate but it may be helpful when we compare it with that of the ABG. If there is a difference between the measured oxyhaemoglobin of the pulse oximeter and the calculated oxyhaemoglobin of the ABG, then a "saturation gap" exists and methemoglobin may be the cause. With a methemoglobin level of 3-15% skin can turn to a pale gray or blue. With levels above 25% cyanosis unaffected by oxygen administration may occur. Levels above 50% might lead to coma and death. Methaemoglobinemia may be produced in susceptible individuals like those with G-6PD deficiency or pelvic tuberculosis.[4] The dye can extravasate in cases of chronic PID, pelvic TB or injection of dye under pressure in presence of blocked tubes.

Methylene blue induces methemoglobinemia at doses greater than 7 mg/kg of body weight. But in our case, 50mg of methylene blue was diluted in 100ml of normal saline and was used in a concentration of 0.5%. Inspite of using a very low concentration and low amount of methylene blue, our patient had developed methaemoglobinuria. This blue coloured urine could have occurred due to extravasation of the dye into the bladder or mild

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systemic anaphylaxis. Systemic anaphylaxis has been reported with methylene blue after laparoscopic chromopertubation in the form of generalized bluish urticaria.[4,5] Millo et al., reported fatal pulmonary oedema following laparoscopic chromopertubation.[4] Mhaskar reported methemoglobinemia following chromopertubation in a treated pelvic tuberculosis case.[6] O'Sullivan[7] advises the use of very dilute solution of the dye (1 ml of 1% methylene blue dye diluted in 100 ml of sterile saline).

Mild symptoms may be adequately treated with supplemental oxygen to maximize the oxygen-carrying capacity of remaining normal hemoglobin and with discontinuation of the causative medication. Ascorbic acid 1g orally TDS can also be given.

CONCLUSION

It is important to publish reports on adverse events from a technique which is commonly used in clinical practice. Methhaemoglobinuria should not always be considered lightly as a sign of extravasation, this can be an underlying sign of systemic anaphylaxis. There are many adverse events due to methylene blue that have been reported in literature. As most clinicians are unaware of this condition, our experience with this case is being reported to highlight this important point and to create awareness among the gynaecologists. In our case it was a near miss as we had diagnosed the complication early and the patient was kept under strict observation. High index of suspicion and awareness about hypersensitivity reactions should be borne in mind by the gynaecologist to help in avoiding morbidity and mortality. Ideally, sterile methylene blue should be used for operative procedures such as laparoscopic chromopertubation. To prevent adverse reactions to the dye,

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