



## Anaesthetic management of a pregnant women taking sildenafil for intra uterine growth retardation undergoing caesarean section: A case report.

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## ABSTRACT

The role of Sildenafil was found in the potential weight gain of the foetus in pregnant women with intrauterine growth retardation (IUGR). Sildenafil acted by inhibiting phosphodiesterase type 5 (PDE5), which was an important enzyme responsible for the degradation of Cyclic guanosine monophosphate (cGMP), resulting in prolongation of action of cGMP and therefore prolonged smooth muscle relaxation and vasodilation of smooth muscle. The mechanism behind the beneficial effect on IUGR was its vasodilator action and, hence, an increase in uteroplacental circulation. But the main issue during anaesthesia was fear of severe hypotension, ocular side effects, and bleeding due to the effect of sildenafil. which was expected in pregnant women taking Sildenafil for intrauterine growth retardation undergoing caesarean section. Severe hypotension was due to augmentation of hypotensive effect of sildenafil and regional anaesthesia. A 29-year-old female, previously healthy, non-smoking, at 33 weeks' period of gestation presented with complaints of headache and pedal edema in third trimester and was diagnosed with gestational hypertension. On the 28th day of admission, she had episodes of elevated blood pressure. The patient was considered for emergency caesarean section after taking high-risk consent. Techniques for cesarean sections include the single shot spinal technique, epidural catheter technique, or the combined spinal-epidural technique (CSE). While spinal anaesthesia offers a simpler approach with a faster and more reliable onset of surgical anaesthesia, it may be associated with abrupt hemodynamic changes. On the contrary, epidural anaesthesia allows for a gradual onset of sympathectomy, titrated dosing, and postoperative analgesia. In this case, the decision was made to opt for epidural anaesthesia over spinal approach was made to allow for careful drug titration and enhance hemodynamic stability. We conclude that graded epidural epidural anaesthesia played an important role in the prevention of hypotension that was expected in pregnant women taking Sildenafil for intrauterine growth retardation undergoing caesarean section.

**KEY WORDS:** Caesarean section, hypotension, sildenafil, anaesthesia.

## INTRODUCTION

Sildenafil has been used for a long time for male erectile dysfunction (ED). This drug potentiates the action of nitric oxide by promoting the inhibition of phosphodiesterase of type 5, leading to a powerful vasodilator effect [1]. There are studies on the use of Sildenafil in various other conditions, ranging from pulmonary hypertension (PHTN) to improve athlete performance of athletes at altitude [2,3]. In addition to ED and PHTN, sildenafil may prove useful for some other conditions, such as mountain sickness, Raynaud's phenomenon, heart disease, and obstetric condition (IUGR) [4]. The primary concern during anaesthesia came from the apprehension of severe hypotension, ocular side effects, and bleeding attributed to the effects of sildenafil in pregnant women undergoing caesarean sections due to intrauterine growth retardation. Anticipated hypotension was a result of the potentiated hypotensive impact of sildenafil combined with regional anaesthesia. Graded epidural anaesthesia played a crucial role in mitigating the risk of hypotension. Here, we report a case of caesarean section in pregnant women who were on sildenafil for intrauterine growth retardation (IUGR).

## CASE REPORT

**PATIENT INFORMATION:** A 29-year-old female, G3P2L0 in the 33-week gestation period presented with complaints of headache and pedal edema complaints in third trimester and was diagnosed with gestational hypertension and started a tablet labetalol 200 mg BD.

**CLINICAL FINDINGS:** The patient was on regular antenatal check up in a private hospital and her first and second trimesters were uneventful. The patient had a previous bad obstetric history. Her first pregnancy was an IUD at 8 weeks of gestational period due to antepartum haemorrhage. Her second pregnancy was also an IUD in the 7<sup>th</sup> month gestational period, due to a sudden stoppage of foetal cardiac activity. The patient had undergone caesarean sections for the second pregnancy.

**TIMELINE:** 33-week pregnant women admitted with complaints of headache and pedal edema and were diagnosed as gestational hypertension with IUGR. Amstarted tablet labetalol 200 mg twice a day, tablet sildenafil 25 mg four times a day and injection enoxaparin 0.6 mg once a day subcutaneously for IUGR. The 24-hour urine examination performed at the time of admission and every week during hospitalisation and report showed proteinuria of 500 mg every time. It was a serious condition characterised by high blood pressure and damage to organs such as the liver and kidneys. On the 28<sup>th</sup> day of admission, she had episodes of increased blood pressure, following which she started an injection of labetalol 200 mg 4 times a day. On the 29<sup>th</sup> day of admission, the patient also complained of blurring of vision, so the obstetrician decided to terminate the pregnancy. The patient was considered for an emergency caesarean section and graded epidural anaesthesia was planned. The patient was observed in the postoperative unit for an hour after caesarean section and later transferred to the ICU for further monitoring. On the second postoperative day, the patient shifts from the ICU to the ward and the seventh postoperative day, discharged from the hospital.

**DIAGNOSTIC ASSESSMENT:** Ultrasound showed absent end-diastolic flow in umbilical artery, bilateral uterine artery notching, elevated pulsatility index (PI) of ductus venosus. So a diagnosis of pregnancy with gestational hypertension with intrauterine growth retardation (IUGR) was made. All other investigations were within normal limits. Hypotensive episodes (mean arterial pressure less than 70 mmHg) were managed by intravenous crystalloid and mephentermine.

**THERAPEUTIC INTERVENTION:** The obstetrician had started tablet sildenafil 25 mg 4 times a day and injection enoxaparin 0.6 mg once a day subcutaneously for IUGR. Tablet labetalol 200 mg twice daily continued. Her vital charting was done regularly and was within normal limits. On day of admission, she had episodes of increased blood pressure, following which she started on injection labetalol 200 mg 4 times a day. The next day the patient also complained of blurred vision, so obstetrician decided to terminate the pregnancy as early as possible and the injection of MgSO<sub>4</sub> started and injection enoxaparin stopped. The patient was considered for an emergency caesarean section after taking high-risk consent. All standard ASA (American Society of Anesthesiologists) monitors were attached and vitals were recorded. Two wide-bore iv cannulas were secured. Additionally, the left radial artery was cannulated under all strict aseptic precautions with a 20G catheter using the seldinger technique for continuous monitoring of BP. Graded epidural anaesthesia was planned to avoid inadvertent hypotension. A 18G epidural catheter was placed in the L4-L5 intervertebral space in seated position and catheter fixed at the 10 cm mark. The epidural space was confirmed by the loss of resistance technique and the positive meniscus sign technique. After negative cerebrospinal fluid (CSF), a 3 ml test dose containing 2% lignocaine and 1:200,000 epinephrine was administered in the epidural catheter and negative test response was obtained. Then 0.5% plain bupivacaine 10 ml was given. An additional dose of 10 ml of 0.5% plain bupivacaine was given to achieve T6 sensory level. Our target mean arterial pressure was maintained to more than 70 mmHg during surgery. There were two episodes of hypotension (during both hypotensive episodes mean arterial pressure reached up to 50 mmHg), which was managed with intravenous crystalloid and 6 mg intravenous mephentermine. The surgery was uneventful, with a blood loss of 550 ml.

**FOLLOW UP AND OUTCOMES:** The patient was observed in the postoperative unit for an hour and later transferred to the ICU for further monitoring. The patient did not complain of further deterioration of vision intraoperatively or postoperatively. Both epidural and spinal anaesthesia are commonly used during cesarean sections. Epidural anaesthesia is generally considered to provide better hemodynamic stability compared to spinal anaesthesia. Gradual onset, ability to titrate the dose, and more selective blockage can contribute to a smoother and more controlled impact on blood pressure.

## DISCUSSION

Today, in addition to ED and PAH, sildenafil is used for therapeutic purposes in IUGR [4]. The mechanism behind the beneficial effect in IUGR is also vasodilatory action and therefore increases in the uteroplacental circulation [5-8]. In these cases, the main issue during anaesthesia was fear of severe hypotension, ocular side effects, and bleeding due to effect of sildenafil [9].

Severe hypotension is due to augmentation of the hypotensive effect of sildenafil and anaesthesia (both IV induction agent and inhalational agent). The vision abnormality due to sildenafil may be due to vascular insufficiency at the head of the optic nerve, weaker inhibitory action on PDE6 (which regulates signal transduction pathways in retinal photoreceptors). Under anaesthesia when severe hypotension occurs, the autoregulatory mechanism of the ophthalmic and central retinal arteries is deranged leading to hypoperfusion and vision loss. In our case, when the patient complained of blurring of vision we couldn't conclude if it was due to sildenafil or due to impending eclampsia. Typical neuraxial techniques for cesarean sections include single-shot spinal technique, the epidural catheter technique, or the combined spinal-epidural technique (CSE). Spinal anaesthesia is an easier technique, with a faster and more reliable onset of surgical anaesthesia, but may be associated with abrupt hemodynamic alterations. Epidural anaesthesia allows a slow onset of sympathectomy, a titrated dosing, and the use of postoperative analgesia [10]. In this case, epidural anaesthesia was selected over a spinal approach to allow careful drug titration and better hemodynamic stability. Keeping all this in mind, we decided to choose an anaesthetic approach (graded epidural technique) that would least alter patients' hemodynamics.

**PATIENT PERSPECTIVE:** Graded epidural anaesthesia will be used in the future as a very promising technique in the prevention of hypotension, which is expected in pregnant women with gestational hypertension taking Sildenafil.

## CONCLUSIONS

Graded epidural anaesthesia played an important role in preventing hypotension, which was expected in pregnant women taking Sildenafil for intra uterine growth retardation undergoing caesarean section. Graded epidural anaesthesia could be a better possible anaesthesia technique over spinal anaesthesia because it allows careful drug titration and better hemodynamic stability in those patients taking sildenafil with high risk of hemodynamic instability.

## SUPPLEMENTARY INFORMATION

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**Institutional Review Statement:** The study was conducted according to the guidelines of the Declaration of Helsinki.

**Informed Consent Statement:** Not applicable

**Data Availability Statement:** The datasets generated and analyzed during the current study are available from the corresponding author on reasonable request.

**Conflicts of Interest:** The authors declare no conflicts of interest.

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