

## Sildenafil Citrate in Fetal Growth Restriction

Subrat Panda, Ananya Das\*, Hossain Md Nowroz

- Department of Obstetrics & Gynecology, North Eastern Indira Gandhi Regional Institute of Health & Medical Sciences (NEIGRIHMS), Meghalaya, India

### Abstract

**Background:** Pregnancies with early onset fetal growth restriction have poor perinatal outcome. Sildenafil citrate (PDE -5 inhibitor) as a vasodilator increases uteroplacental blood flow and potentiates fetal growth.

**Case Presentation:** In this study, a case was examined and Sildenafil was administered for her. It was found that Sildenafil improved the uterine blood flow with a favorable fetal outcome at delivery.

**Conclusion:** Sildenafil, as a vasodilator has emerged as a potential management option in the treatment of Intra Uterine Growth Retardation (IUGR) and preeclampsia by later normalization in velocimetric profile.

**Keywords:** Fetal growth restriction, Pregnancy, Sildenafil citrate.

**To cite this article:** Panda S, Das A, Nowroz HM. Sildenafil Citrate in Fetal Growth Restriction. *J Reprod Infertil.* 2014;15(3):168-169.

\* Corresponding Author:  
Ananya Das, Department of  
Obstetrics & Gynecology,  
North Eastern Indira Gandhi  
Regional Institute of Health  
& Medical Sciences  
(NEIGRIHMS),  
Mawdiangdiang, Shillong-  
793018, Meghalaya, India  
E-mail:  
mailmedrananyadas@  
rediffmail.com

Received: Feb. 15, 2014

Accepted: Apr. 13, 2014

### Introduction

Fetal growth restriction (FGR) is a major cause of perinatal mortality and morbidity. FGR is a wide-ranging pregnancy problem with a number of possible mechanisms leading to reduced fetal growth. Only a proportion of pregnancies with FGR show altered maternal peripheral vascular resistance. Some pregnancies with fetal growth restriction have elevated peripheral maternal vascular resistance in uterine arteries and hence poor perinatal outcome. Such pregnancies, if resistance values are normalized in later trimesters have a significantly better outcome (1). Sildenafil citrate increases uterine blood flow and potentiates estrogen-induced vasodilation (2). In this paper, a case of early onset fetal growth restriction was reported where administration of Sildenafil citrate could normalize the uteroplacental insufficiency with a favorable fetal outcome.

### Case Presentation

A 32 year old G4P0L0A3 attended our Out Patient Department (OPD) in January 2013 with 12 weeks of pregnancy. She had regular antenatal check-ups, until 14 weeks; she required an emer-

gency cerclage for cervical incompetence. She had a normal anomaly scan with no other comorbid condition. At 26 weeks and 3 days, on clinical suspicion of oligohydramnios, ultrasound with Doppler was performed. The case had reduced amniotic flow index with reduced umbilical artery diastolic flow, middle cerebral artery brain sparing effect and estimated fetal weight of around 600 gr. She was then admitted to hospital for further management. A repeat ultrasonography after 3 days showed absent umbilical artery end diastolic flow with brain sparing effect. In the umbilical artery Doppler, pulsatility index (PI) was 1.28, resistive index (RI) was 0.64 and systole/diastole ratio (S/D) was 3.47. Next, Sildenafil citrate 50 mg BD was used and its amount gradually increased in 7 days to 50 mg TDS with continuous fetal surveillance. Doppler showed improved uteroplacental blood flow with estimated fetal weight of around 800 gr and hence pregnancy could be continued to another 3 weeks. Now, PI was 0.81, RI was 0.40 and S/D was 2.22. With the diagnosis of FGR with uteroplacental insufficiency, surveillance continued with ultrasonography

and Doppler. Unfortunately, Doppler again showed absent end diastolic flow after a few days and 2 doses of 12 mg betamethasone injection were administered for her 24 hr apart. Repeat Doppler after 3 days showed reversed end diastolic flow. At a gestational age of 30 weeks, then, patient and her husband were counseled regarding the need for emergency Caesarean section and the associated risks of perinatal morbidity and mortality. A live male baby of 800 gr was delivered and shifted to Neonatal Intensive Care Unit (NICU) for further management. After 80 days of NICU care, the baby was finally discharged healthy with a weight of 2.3 kg. After 1 month of discharge, mother and infant came for follow up and both were doing perfectly well. Also, the infant was checked by pediatrician and was found healthy.

### Discussion

In pregnancies with fetal growth restriction and without preeclampsia, a reversible increased myometrial arterial tone by phosphodiesterase inhibition has been reported *in vitro* (3). Sildenafil citrate induces vasodilation through inhibition of type 5 phosphodiesterase (PDE5) (4). PDE5 is responsible for the degradation of cGMP to guanosine monophosphate. Therefore, inhibiting PDE5 delays the breakdown of cGMP and increases vasodilation (5). A recent report suggested that Sildenafil citrate stimulates vasodilation in myometrial biopsies collected from IUGR pregnancies at the time of Cesarean section (4).

In this study, Sildenafil with fetal growth restriction was used in an attempt to induce vasodilatation and improve uteroplacental perfusion resulting in improved Doppler indices.

Currently, there is no effective therapy for severe early-onset FGR. Sildenafil citrate vasodilates the myometrial arteries isolated from women with IUGR-complicated pregnancies. Sildenafil treatment was associated with increased fetal AC growth (6).

### Conclusion

To achieve optimal fetal growth, adequate blood flow in uteroplacental vascular function is essen-

tial. Abnormal vasculature adaptation, resulting in aberrant blood flow, has been implicated as a possible cause of fetal growth restriction (FGR) though Samangaya *et al.* ruled out prolonged pregnancy in women with preeclampsia using Sildenafil (7). Sildenafil, as a vasodilator has also emerged as a potential management option in the treatment of FGR and preeclampsia by later normalization in velocimetric profile.

### Conflict of Interest

The authors declare no conflict of interest.

### References

1. Soregaroli M, Valcamonico A, Scalvi L, Danti L, Frusca T. Late normalisation of uterine artery velocimetry in high risk pregnancy. *Eur J Obstet Gynecol Reprod Biol.* 2001;95(1):42-5.
2. Zoma WD, Baker RS, Clark KE. Effects of combined use of sildenafil citrate (Viagra) and 17beta-estradiol on ovine coronary and uterine hemodynamics. *Am J Obstet Gynecol.* 2004;190(5):1291-9.
3. Wareing M, Myers JE, O'Hara M, Kenny LC, Taggart MJ, Skillern L, et al. Phosphodiesterase-5 inhibitors and omental and placental small artery function in normal pregnancy and pre-eclampsia. *Eur J Obstet Gynecol Reprod Biol.* 2006;127(1):41-9.
4. Wareing M, Myers JE, O'Hara M, Baker PN. Sildenafil citrate (Viagra) enhances vasodilatation in fetal growth restriction. *J Clin Endocrinol Metab.* 2005;90(5):2550-5.
5. Ballard SA, Gingell CJ, Tang K, Turner LA, Price ME, Naylor AM. Effects of sildenafil on the relaxation of human corpus cavernosum tissue *in vitro* and on the activities of cyclic nucleotide phosphodiesterase isozymes. *J Urol.* 1998;159(6):2164-71.
6. von Dadelszen P, Dwinnell S, Magee LA, Carleton BC, Gruslin A, Lee B, et al. Sildenafil citrate therapy for severe early-onset intrauterine growth restriction. *BJOG.* 2011;118(5):624-8.
7. Samangaya RA, Mires G, Shennan A, Skillern L, Howe D, McLeod A, et al. A randomised, double-blinded, placebo-controlled study of the phosphodiesterase type 5 inhibitor sildenafil for the treatment of preeclampsia. *Hypertens Pregnancy.* 2009;28(4):369-82.