

Study of Effect of Low Dose Aspirin in Prevention of Preeclampsia and IUGR

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Abstract

Preeclampsia is prevalent in 3-10% of pregnant women. The etiology is multifactorial. There is endothelial dysfunction leading to placental ischemia, maternal syndrome of hypertension and proteinuria. Aspirin has anti-inflammatory and immunomodulatory action. The therapeutic effect of low dose aspirin can be used in prevention of preeclampsia in high risk antenatal group.

Aims and objectives: This study was done to assess the therapeutic efficacy of low dose aspirin in prevention of preeclampsia and its complications in at risk antenatal women

Materials and Methods : This is a prospective study to measure the therapeutic effect of low dose aspirin versus placebo is the prevention of pre eclampsia syndrome and IUGR in antenatal women at risk. This includes 210 antenatal patients who are at risk of developing preeclampsia. The antenatal mothers were enrolled between 12-20 weeks and given aspirin till 34 weeks of gestation and the control group was not given aspirin. .

Observation and Results: there is a reduced incidence of pre eclampsia and its complications in at risk antenatal women who are on aspirin prophylaxis compared to control group. There is no significant difference in incidence of IUGR in both groups

Conclusion: Low dose aspirin prophylaxis may be considered in high risk antenatal mothers to prevent development of pre eclampsia and its complications

KEYWORDS: Aspirin, preeclampsia, IUGR, uterine artery doppler ultrasound.

Date of Submission: 03-02-2021

Date of Acceptance: 18-02-2021

I. Introduction

Preeclampsia is a heterogeneous disorder prevalent in 3-10% of pregnant women globally¹. Although its prevalence is low, it is the second most common cause of maternal and perinatal mortality and morbidity worldwide. Apart from delivery, there is no effective treatment for preeclampsia making its primary and secondary prevention, a major public health issue.

There is potential risk for adverse serious maternal outcomes including the HELLP syndrome, coagulopathy, eclampsia, stroke as well as adverse neonatal complications. Preeclampsia is responsible for >70,000 maternal deaths each year around the world². Preeclampsia is associated with increased long term risk for development of cardiovascular disease in both mother and the infant^{3- 4} .

Women are at risk of preeclampsia if they have any underlying risk factors like Chronic kidney disease, elderly age, higher BMI, chronic hypertension, multifetal gestation, autoimmune disorders, Gestational diabetes. At low doses, aspirin is widely used to prevent pregnancy related vascular disorders like preeclampsia, IUGR and anti phospholipid syndrome^{5 - 6} . Yet, target population, screening modality and dosage of aspirin are still a matter of debate.

Aspirin is a cyclooxygenase inhibitor which has anti inflammatory and anti platelet properties. Low dose aspirin has been used during pregnancy most commonly to prevent or delay the onset of preeclampsia.

II. Materials and Methods

The clinical study was performed on antenatal patients attending outpatient department at CMCH Coimbatore between October 2018 to June 2019. There were 229 AN mothers who satisfied the inclusion criteria were included in the study, 19 patients who lost follow up were excluded . They were divided into study and control groups by random allocation .The study group of 104 antenatal mothers were given 150 mg of aspirin .The control group of 106 did not receive any medication.

Informed written consent was obtained in all patients. Pregnant women were done target scan .Marginal fetal anomalies were excluded from the group. Doppler ultrasound examination of uterine artery was done

between 12-20 weeks of gestation to ascertain the pulsatility index of uterine artery. Doppler ultrasound examination of umbilical artery was done to detect IUGR after 28 weeks.

Inclusion Criteria

Pregnant women with 12 -20 weeks of gestation at risk of developing gestational hypertension

Risk Criteria

- More than 30 years
- Chronic essential hypertension
- Multifetal Gestation
- Gestational diabetes mellitus
- Previous preeclampsia
- Increased BMI
- High pulsatile index of uterine artery

Exclusion Criteria

- Fetal anomalies
- Allergic to aspirin
- H/o active acid peptic disorder
- Liver /renal disease
- Congenital heart disease
- Bleeding disorder

Evaluation and Treatment

Detailed maternal history involving age, gestational age, parity, pre pregnancy body mass index, previous low birth weight, chronic hypertension, gestational diabetes and previous pre-eclampsia was obtained. Gestational age ascertained as per LMP and 1st trimester ultrasound..

The mean pulsatility index of the two uterine arteries were calculated. The presence and absence of early diastolic notching was noted. Mean pulsatile index of 1.8 was taken as a high risk factor for pre eclampsia.

150 mg of aspirin was given to the study group once daily in the afternoon from 12 weeks till 34 weeks of gestation .Ultrasound was done at each visit to assess the fetal growth. Ultrasound and fetal doppler done were to assess the growth velocity after 28 weeks. Estimation of the fetal weight and umbilical artery doppler was done to detect IUGR.

The criteria of preeclampsia is followed as per the ICOG guidelines which includes two recordings of Systolic BP of more than 140mmHg and diastolic BP of more than 90 mmHg at least four hours apart in a previously normotensive woman, proteinuria of 300 mg or more in 24 hours urine, or urine albumin 1+, at least 2 readings, if no 24 hours collection is available.

III. Results

A total of 229 women were studied and 19 women lost follow up. Of the remaining 210 women studied, 104 women in the study group were given aspirin 150 mg. 106 women in the control group were not given aspirin. All the patients in the study and control group were treated for chronic hypertension and gestational diabetes mellitus with antihypertensives and insulin as needed

. Of the high risk women followed up 73 patients developed hypertensive Disorders. The incidence of hypertension in all the high risk women were 34.7%. The incidence of pre eclampsia in the study group was 28.8% compared to that of the incidence in the control group which was 40.5%. Aspirin reduced the incidence of pre eclampsia by 11.7%. In all high risk subsets, aspirin reduced the risk of pre eclampsia compared to that of the control group irrespective of gestational age at entry.

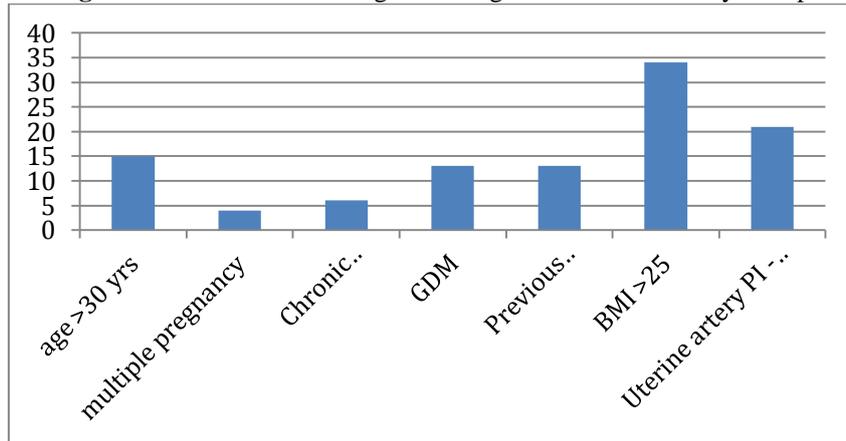
The incidence of pre eclampsia is lower in the study group than in the control group. There is no significant difference in the incidence of postpartum hemorrhage, abruption, preterm , IUGR in the control and the study group.

The incidence of IUGR in the study group was 17.5% and in the control group was 20.5%. There is no significant difference in the incidence of IUGR in both groups. Aspirin did not lower the risk of IUGR in at risk antenatal women.

Table 1: Comparison of Effect of Aspirin on incidence of preeclampsia in high risk antenatal women

Risk Factor	Aspirin Group	Control Group	Relative Risk
Age >30yrs	14.2%	20%	0.71
Multiple pregnancy	50%	50%	1
Chronic hypertension	40%	66%	0.6
Gestational diabetes	22.2%	38.5%	0.58
Previous Preeclampsia	33.3%	38.4%	0.87
BMI>25	21.4%	26.4%	0.81
Uterine artery PI 1.8	41.9%	71.4%	0.59

Figure 1. Characteristics of high risk Pregnant Women In study Group



Characteristics of high risk Pregnant Women In Control Group

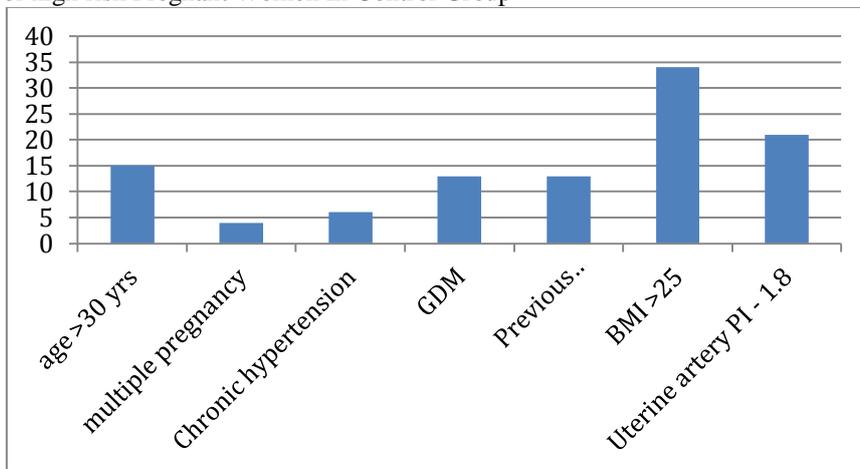


Table 2. Incidence of IUGR In Aspirin and Control Group

	Aspirin Group	Control Group	Relative Risk
IUGR	18	22	0.83

Figure: 3. Incidence of IUGR

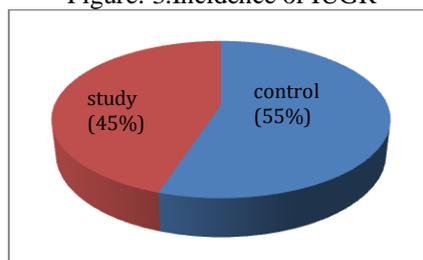


Table 3.Maternal and Perinatal Outcome In Study And Control Group

Complication	Aspirin Group	Control Group
Postpartum hemorrhage	5	6
Abruptio placenta	2	3
Preterm delivery	35	41
IUGR	18	22

IV. Discussion

Aspirin is a non-steroidal anti-inflammatory drug that acts on cyclooxygenase pathways in a dose dependent manner. At lower dosage, aspirin irreversibly acetylates cyclooxygenase thereby decreasing the synthesis of thromboxane A2 without affecting the vascular endothelial production of prostacyclin⁷. Prostacyclin is a potent vasodilator and inhibits platelet aggregation whereas thromboxane A2 is a potent vasoconstrictor and promotes platelet aggregation. The imbalance in the metabolism of prostacyclin and thromboxane A2 leads to development of preeclampsia. Preeclampsia may also be due to causes like poor placentation, ischemia, reperfusion and maternal inflammatory response to trophoblast⁸. Various studies have been done in prevention of preeclampsia by using aspirin. Few studies state that aspirin was effective if started before 16 weeks or later. It was clear that aspirin, even when started at late gestational age has got a role.

In our study, the women with abnormal uterine artery doppler as a risk factor had a higher incidence of preeclampsia in both the groups. Aspirin reduced the incidence of preeclampsia in the study group(44%) compared to that of the control group(7%).Patients with abnormal uterine artery doppler are the most benefitted by aspirin.

In all the subgroups of high risk patients, incidence of preeclampsia is less in study group.The results of our study shows no significant difference in the incidence of PPH, abruption, preterm between the control and study groups.

IUGR is associated with chronic asphyxia, failure to thrive, poor perinatal outcome. There are studies stating the beneficial effects of aspirin in preventing IUGR. In our study, there is no significant difference in incidence of IUGR in both the groups.

V. Conclusion

Aspirin is an economical, simple, easily available drug which in low dose is considered safe and associated with little adverse effects. Low dose aspirin prophylaxis may be considered in high risk antenatal mothers to prevent the development of preeclampsia and its complications. Aspirin is especially useful in antenatal patients with high uterine artery doppler index. Early detection of risk factors and implementation of aspirin therapy in the preclinical stage of preeclampsia reduces maternal mortality and morbidity and improves the outcome. Low dose aspirin is therefore a useful intervention in antenatal women at risk to developing preeclampsia especially in developing countries.

References

- [1]. Nidhi sharma,Sunayana Srinivasan, Jayasree Sriivasan, Role of Aspirin in High Pulsatility Index of Uterine Artery: A Consort Study J Obstet Gynaecol India, 2018 Oct;68(5):382-388.
- [2]. Steegers EA, von Dadelszen P, Duvekot JJ, Pijnenborg R. Pre-eclampsia. Lancet 2010;376: 631-44.
- [3]. Tooher J, Thornton C, Makris A, et al. Hypertension in pregnancy and long-term cardiovascular mortality: a retrospective cohort study. Am J Obstet Gynecol 2016;214: 722.e1-6.
- [4]. Lo JO, Mission JF, Caughey AB. Hypertensive disease of pregnancy and maternal mortality. Curr Opin Obstet Gynecol 2013;25: 124-32
- [5]. Bujold E, Roberge S, Lacasse Y, Bureau M, Audibert F, Marcoux S, et al. Prevention of preeclampsia and intrauterine growth restriction with aspirin started in early pregnancy: a meta-analysis. Obstet Gynecol 2010;116(2 Pt 1):402-14.
- [6]. Bujold E, Morency AM, Roberge S, Lacasse Y, Forest JC, Giguere Y. Acetylsalicylic acid for the prevention of preeclampsia and intrauterine growth restriction in women with abnormal uterine artery Doppler: a systematic review and meta-analysis. J Obstet Gynaecol Can 2009;31:818-26.
- [7]. Clarke RJ, Mayo G, Price P, FitzGerald GA. Suppression of thromboxane A2 but not of systemic prostacyclin by controlled-release aspirin. N Engl J Med 1991;325:1137-41.
- [8]. American College of Obstetricians and Gynecologists. Hypertension in pregnancy . Washington, DC: American College of Obstetricians and Gynecologists; 2013. Available at: <http://www.acog.org/Resources-And-Publications/Task-Force-and-Work-Group-Reports/Hypertension-in-Pregnancy>. Retrieved January 24, 2018.

Dr.P.Thilgavathi, et. al. "Study of Effect of Low Dose Aspirin in Prevention of Preeclampsia and IUGR." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 20(02), 2021, pp. 44-47.