

Evaluation of Role of Low Dose Aspirin and Antioxidants For Prevention of Pregnancy Induced Hypertension in Primigravida



Medical Science

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ABSTRACT

Introduction: Hypertensive disorders are one of the commonest medical problems, encountered during pregnancy. Hypertension is a human pregnancy specific disorder that adversely affects the health of mother as well as the fetus. It has been suggested that, supplementation of women with abnormal flow velocity waves in uterine arteries, with aspirin and antioxidants, diminishes the frequency of proteinuria, hypertension. Design: In this study 40 subjects in the case group and 40 subjects in the control group were enrolled. The case group subjects received the additional medication in the form of low dose aspirin and antioxidants as a prophylaxis of hypertension. Discussion: There was decrease incidence of preeclampsia, oligohydramnios, meconium stained liquor and low birth weight in case group. Conclusion: There is a preventive role of low dose aspirin and antioxidants against preeclampsia, MSL & low birth weight.

Introduction

Hypertensive disorders are one of the commonest medical problems, encountered during pregnancy. It complicates around 7-10% of all pregnancies. Moreover the incidence of hypertension is higher in primigravidas compared to multigravidas and in developing countries.

Hypertension during pregnancy is defined as sustained systolic blood pressure of 140 mm Hg or more and/or diastolic blood pressure of 90 mm Hg or more on two occasions, at least 6 hours apart but within 7 days. Proteinuria is defined as more than or equal to 0.3 gm of protein in urine in 24 hours, but for convenience it was taken as $\geq +1$ dipstick on two samples at least 6 hours apart in the present study. When the hypertension is accompanied by proteinuria or convulsions it is called as preeclampsia/eclampsia respectively.²

Hypertension is a human pregnancy specific disorder that adversely affects the health of mother as well as the fetus. Ultimately it is a major contributor of perinatal mortality.

There is imbalance between lipid peroxidation and antioxidant defence mechanism in preeclampsia which results in endothelial dysfunction. Vasoconstrictor substances like Thromboxane A₂ are increased and vasodilator substances like Prostaglandins and Nitric oxide are decreased in preeclampsia.³

So far many studies have been done to evaluate the role of aspirin and antioxidant substances in prevention of preeclampsia. Aspirin is a cyclooxygenase inhibitor and it has a positive effect on correcting the imbalance between TXA₂ and PGI₂ in preeclampsia when started in second trimester.⁴ Many antioxidant substances like calcium, magnesium, zinc, B-carotene, lycopene, vitamin C and vitamin E can be used to correct the imbalance between antioxidant defence and lipid peroxidation mechanism. It has been suggested that, supplementation of women with abnormal flow velocity waves in uterine arteries, with aspirin and antioxidants, diminishes the frequency of proteinuria, hypertension and delays the appearance of severe end-stage disease, hence screening will help identify such women.⁵

AIM AND OBJECTIVES

AIM : To study the role of aspirin and other antioxidants in prevention of hypertensive disorders of pregnancy in primigravida subjects.

OBJECTIVES

To evaluate the role of aspirin and antioxidants

- 1) In prevention of hypertension and there by the outcome of

pregnancy in terms of maternal and perinatal morbidity and mortality.

- 2) In decreasing systolic blood pressure (SBP) and diastolic blood pressure (DBP) and thereby on the severity of hypertensive disorders of pregnancies.
- 3) In prevention of oligohydramnios, fetal growth restriction (FGR).

Methodology

This is a prospective randomized controlled study for evaluation of role of aspirin and antioxidants in prevention of hypertensive disorders of pregnancy in primi gravida. It was carried out at department of Obstetrics and Gynecology in my institute between May 2011 and April 2013. 80 women attending antenatal OPD were included in this study.

CRITERIA FOR INCLUSION IN THE STUDY

Normal healthy primigravidas with gestational age between 13 and 24 weeks.

Subjects should not have any medical disorders like anemia, chronic hypertension, diabetes etc. or any major illness.

All the subjects were screened at 24 week of gestation, on the basis of uterine artery Doppler waveforms. Those who were having persistence of diastolic notch were labelled as case group and those who were having no notch were classified in the controlled group.

Case group was the study group, which received the tablet of aspirin 75 mg once a day and a multivitamin capsule containing vitamin C 150 mg, vitamin E 50 mg, lycopene 5 mg, omega 3 fatty acids 300 mg along with routine therapy of iron and calcium. The control group, which did not receive any additional medication apart from iron and calcium therapy. Thus number of subjects was 40 in each group. Routine antenatal care was explained to the subjects and on each visit their vitals including pulse, BP, proteinuria, weight were recorded. BP was taken in left arm in sitting position after the subjects have taken rest of 15 minutes. The disappearance of Korotkoff sound was taken as the measurement of diastolic BP. On each visit they were prescribed medicines till next visit and explained accordingly.

OBSERVATION AND DISCUSSION

This study includes 80 subjects, out of which 40 are in case group and 40 are in control group. Data was collected as per proforma and observed. Case group included 40 subjects who were having persistent end-diastolic notch at 24 weeks uterine artery Doppler. Control group included 40 subjects who were having normal uterine artery Doppler wave forms at 24 weeks of

gestation.

The age group involved is 19- 31 years.The highest frequency of the subjects falls in 21-25 years of age group.The mean of maternal age in years is 22.2 for case group while it is 22.5 for control group.

The distribution of maternal education in each group shows that illiterate is37.5% In case group and 40% in control group, primary education is27% in case group, 30% in control group and secondary education is35% in case group while 30% in control group.In our study the majority of subjects are in housewife group that is 75% in case group and 72.5% in control group and majority of they resides in urban area, that is 92.5% in case group and 87.5% in control group.The mean gestational age at which the subjects were enrolled in the study are 20 weeks for case group and 20.7 for control group.

TABLE-1:DISTRIBUTION OF NUMBER OF SUBJECTS, EXHIBITING HYPERTENSION DURING THE COURSE OF THE STUDY

| GROUP | GESTTIONAL HT | | PREECLAMP-SIA | | ECLAMPسيا | | TOTAL |
|---------|---------------|----|---------------|---|-----------|---|-------|
| | N | % | N | % | N | % | |
| CASE | 2 | 5 | 0 | 0 | 0 | 0 | 2 |
| CONTROL | 4 | 10 | 5 | 5 | 0 | 0 | 6 |
| TOTAL | 6 | | | | | | 8 |

The table 1 show the distribution of the incidence of hypertensive disorders of pregnancy of the subjects in each group.

GESTATIONAL HT : 5% IN CASE GROUP , 10% IN CONTROL GROUP ,

PREECLAMPسيا :CASE 00% CONTROL 05%

ECLAMPسيا :CASE 00% CONTROL 00%

Here the relative risk is 0.33.So there is 66% reduction in risk of PIH.So,the incidence of hypertensive disorders of pregnancy is quite lower in case group.

There was no case of preeclampsia recorded in the case group,where 2 cases were noted in the control group(5%).So,the negative predictive value of uteroplacental Doppler screening studies for prediction of preeclampsia in the subjects having normal uterine artery Doppler at 24 weeks is 95%.The same value is ranging between 94% and 99% in various studies.⁶

In the study conducted by Bujold,⁷the incidence of preeclampsia was 9.3%in the case group and 21.3% for control group. Ruminis D⁸ also showed the incidence of preeclampsia of 6.8% in case group and 29% in control group.The study by Kumar and Sharma⁹ showed the same incidence of 8.6% and 17.7% respectively in case group and the control group.Chappel¹⁰ and Hauth¹¹show the results of preeclampsia 8% and 1.7% in case group and 17% and 5.6% in the control group respectively.

Moreover,no case of preeclampsia has been recorded in any of the group in this study. So even if the hypertension develops in the subjects taking aspirin and antioxidants,its severity is less compared to the subjects not taking them.

TABLE-2:DISRIBUTION OF MEAN BLOOD PRESSURE IN EACH AGE GROUP

| GROUP | MEAN SBP ANTEPAR-TUM | MEAN SBP INTRAPAR-TUM | MEAN DBP ANTEPAR-TUM | MEAN DBP INTRAPAR-TUM |
|---------|----------------------|-----------------------|----------------------|-----------------------|
| CASE | 121.0 | 124.5 | 77.7 | 77.6 |
| CONTROL | 129.1 | 131.4 | 81.5 | 82.8 |

The table 2 shows the distribution of the mean systolic BP and mean diastolic BP during antepartum and intrapartum period in both the case and control groups.This data shows the reduction of mean systolic BP and mean diastolic BP during antepartum and intrapartum period in the case group during antepartum and intrapartum period.The value of mean DBP in mm Hg is 77.7 and 77.6 for case group,while those of control group are 81.5 and 82.8.The study ofKumar and Sharma indicated value for mean DBP in mm Hg of 86.7 and 92.2 for case and control groups respectively.Here P is <0.05 and so the comparison data is significant.So,aspirin and antioxidants help in reducing mean BP.

TABLE-3: DISTRIBUTION OF NUMBER OF SUBJECTS, DEVELOPING OLIGOHYDROAMNIOS DURING THE CORSE OF THE STUDY

| GROUP | OLIGOHYDROAM-NIOS | | NO OLIGOHY-DROAMNIOS | | TOTAL |
|---------------|-------------------|------|----------------------|------|-------|
| | N | % | N | % | |
| CASE | 01 | 2.5 | 39 | 97.5 | 40 |
| C O N T R O L | 04 | 10.0 | 36 | 90.0 | 40 |
| TOTAL | 05 | | 75 | | 80 |

The table 3 shows the distribution of subjects in each group, developingoligohydromnios. The value is 1 for case group and 4 is for control group. So relative risk of developing oligohydroamni-os is 25%(0.25). So it can be concluded that low dose aspirin and antioxidants are helpful in preventing oligohydroamnios

TABLE-4 :DISRIBUTION OF SUBJECTS EXHIBITING MECONIUM STAINED LIQUOR AT THE TIME OF DELIVERY

| GROUP | MSL | | CLEAR LIQUOR | | TOTAL |
|---------|-----|-----|--------------|------|-------|
| | N | % | N | % | |
| CASE | 00 | 00 | 40 | 100 | 40 |
| CONTROL | 03 | 7.5 | 37 | 92.5 | 40 |
| TOTAL | 03 | | 77 | | 80 |

The table 4 shows the distribution of the subjects exhibiting meconium stained liquor at the time of delivery.There were no subjects in the case group having MSL but there were 3 (7.5%) subjects in the control group exhibiting MSL.Here the odds ratio is 0.13 and it indicates role of low dose aspirin and antioxi-dants in reducing the incidence of MSL.

The distribution of mode of delivery in each group.Both the groups are exhibiting the same percentage of the subjects,being delivered vaginally as well as abdominally via lower segment caesarian section.Hence we conclude that low dose aspirin and antioxidants are having no direct impact of the mode of delivery. Moreover the LSCS performed here were for the obstetric indications mainly.

TABLE-5:DISTRIBUTION OF NO OF SUBJECTS,DELIVERING LOW BIRTH WEIGHT BABIES.

| GROUP | BW<2.5kg | | BW>=2.5kg | | TOTAL |
|---------|----------|------|-----------|------|-------|
| | N | % | N | % | |
| CASE | 00 | 00 | 40 | 100 | 40 |
| CONTROL | 10 | 25.0 | 30 | 75.0 | 40 |
| TOTAL | 10 | | 70 | | 80 |

The table 5 and the show the distribution of the subjects delivering low birth weight babies that is <2.5 kg.There were no subjects in case group while the number was 10 for control group,the value is significantly different.So it could be concluded that low dose aspirin and antioxidants are helpful in preventing low birth weight babies.The study by Duley L,¹² also showed that there is 20% reduction in risk of low birth weight babies.

The distribution of the subjects in each group according to their mean birth weight at the time of delivery. The value was 2.96 Kg for the case group and 2.63 Kg for the control group, suggesting significant difference of comparison $P < 0.05$. So it is suggested that low dose aspirin and antioxidants are helpful in preventing low birth weight babies.

CONCLUSION

It was noted in present study that low dose aspirin and an-

tiioxidants may have beneficial effect in the prevention of hypertensive disorders of pregnancy and reduction in severity of hypertension, even if it develops, in the high risk primigravida subjects. Overall improvement of the perinatal outcome was observed in the form of reduction in incidence of oligohydroamnios, meconium stained liquor and low birth weight babies.

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