



Original Research Article

Fundoscopic changes in patients of pre-eclampsia and eclampsia at tertiary care centre in Surat

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ABSTRACT

Context: Pre-eclampsia and Eclampsia are responsible for significant maternal and fetal mortality and morbidity associated with pregnancy.

Aims: To determine incident and assessment of posterior segment changes in Pre-Eclampsia and Eclampsia. To find association of retinal changes in relation to severity of disease with age, parity, blood pressure, proteinuria.

Settings and Design: Cross-sectional study.

Materials and Methods: All cases of pre-eclampsia/eclampsia were included in this study. Age, gravida, gestation period, blood pressure, and proteinuria were available on case records. Through retinal examination was done and findings were noted.

Statistical analysis used: Chi-square test.

Results: A total of 251 patients of pre-eclampsia and eclampsia were enrolled. The mean age of patients was 24.79 years. The gestation period ranged from 20 weeks to 36 weeks; 88 were the primigravida. 223 patients had preeclampsia, and 28 had eclampsia. Retinal changes (hypertensive retinopathy) were noted in 84 patients - Grade 1 in 55, Grade 2 in 27 and Grade 4 in 1. Retinal detachment was seen in one patient.

Conclusions: Retinal changes were seen in 33.46% of patients. Statistical association was found with lower age group, primigravida and severity of pre-eclampsia/eclampsia. No association found with proteinuria.

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1. Introduction

Pregnancy is physiological change in human body accompanied by pathological changes sometimes. Pregnancy Induced Hypertension(PIH) is one of those important pathology accompanying pregnancy.^{1,2} According to national high blood pressure education program (NHBPEP-2000) and American college of obstetricians and gynecologists (ACOG-2002), PIH includes gestational hypertension, pre-eclampsia, and eclampsia.^{3,4} Incidence of Pre-eclampsia in nulliparous women ranges from 3-10% and of that eclampsia develops in about 1 in 2000 deliveries in developed countries and 4 in 2000 deliveries in developing country. Overall incidence of Pre-Eclampsia and

Eclampsia in hospital practice varies widely from 5-15%. The incidence in primigravida is 10% and in multigravida is 5%.⁵ Ocular involvement in Pre-eclampsia and Eclampsia occurs in form of arteriolar attenuations, retinal changes, retinal detachment, etc. It affects visual pathways, from the anterior segment to the visual cortex. Complete blindness with eclampsia and pre-eclampsia is rare, incidences of which is 1-3%.⁶⁻⁸ Direct and Indirect Ophthalmoscopy can easily detect the pathological changes in the fundus and retinal blood vessels in particular that reflect the effect of hypertension throughout the vascular system. Ocular squeal are observed in 30% to 100% of patients with preeclampsia-eclampsia syndrome.⁹ It has been suggested that retinal changes in preeclampsia may indirectly indicate the level of placental vascular status and, hence, placental insufficiency and fetal birth weight.¹⁰

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In this present study, we have tried to evaluate and examine all the ophthalmoscopic changes in case of Pre-eclampsia and Eclampsia and have tried to analyze the impact of various manifestations on the visual morbidity and prognosis.

2. Materials and Methods

A cross sectional, hospital based study done on patients who are diagnosed and admitted at Ante Natal Ward at Tertiary Care Centre, New Civil Hospital, Surat in last two years. Patients who had preexisting systemic diseases like diabetes or hypertension were excluded. Patients with hazy media with difficult fundus visualization were not included in the study.

A total of 251 patients were examined. Detailed history, general physical examination and systemic examination were recorded from available case records. Ocular and fundus examination was performed with indirect ophthalmoscope and various fundus changes noted.

The severity of disease was divided into pre-eclampsia and eclampsia, based on the following findings: Preeclampsia — BP >140/90mmHg, proteinuria, and/or mild edema of legs; Eclampsia — preeclampsia + convulsions.

The retinal changes (hypertensive retinopathy) were graded according to Keith Wagener classification into:

Grade I: Mild generalized arterial attenuation, particularly of small branches;

Grade II: More severe grade I + focal arteriolar attenuation.

Grade III: Grade II + haemorrhages, hard exudates, cotton wool spots.

Grade IV: Grade III + optic disc swelling (Papilloedema).

3. Results

This study conducted on 251 patients of pre-eclampsia and eclampsia can be summarized as follows:

Out of 251 cases enrolled in the study, 223 cases (88%) had pre-eclampsia and 28 cases (12%) had eclampsia. Fundus changes were seen in 84 (33.47%) cases of Pre-eclampsia and eclampsia. It is seen that fundus changes were more observed in cases with eclampsia (60%), followed by pre-eclampsia (30%). Most common retinal changes associated with Pre-eclampsia and Eclampsia are generalized arterial attenuation followed by focal arterial attenuation. Only one patient has retinal detachment and one patient has Papilloedema. In our study, none of the patient had hemorrhages or exudates. The mean age of patients was 24.79 years (SD=4.48) with majority were in the age group of 20-30 yrs.

Chi-Square test is applied for strength of association. Significant association was there in lower age group ($p=0.001$) and in primigravida (OR=5.387, $p<0.05$).

Gestational age and proteinuria are not associated with retinopathy ($p>0.05$).

Table 1: Shows the distributions of patients according to grades of retinal changes

S. No.	Retinal Changes Grades	Total	Percentage
1.	No changes	167	66.53%
2.	Grade 1	55	21.91%
3.	Grade 2	27	10.76%
4.	Grade 3	0	0%
5.	Grade 4	2	0.79%

4. Discussion

In present study, the mean age of patients was 24.79 years. 251 patients were examined of which majority were in the age group of 20-25 yrs. Only 7 patients were above 35 years of age. Out of those cases, 21-30 years have more chances to develop retinopathy changes as compared to other age group.

Bhandari et al in their study observed that amongst the 48 cases of preeclampsia in the age group 18-22 years, 24 cases (50%) showed retinal changes. This was followed by 12 cases (36.36%) from 33 cases of Preeclampsia in the age-group 23-27 years. Next commonly affected age-group was 28-32 years with 14 cases and 7 cases (50%) of them showed retinal changes. Only 1 case out of 4 from age-group between 33-37 years showed changes in fundus.

Kapil AD et al in their study observed that 117 patients were examined only 5 patients were above 40 years of age (4.27%) whereas 7 were teenagers (5.98%). In their study 51 cases in age group of 21-30 years, 19 cases (37%) showed hypertensive retinopathy changes.¹¹

Reddy et al in his study A total of 78 patients were examined; 59 (75.6%) were Malays, 13(16.7%) were Indians and 6(7.7%) were Chinese. The mean age of patients was 30.2 years (range 21-45 years).¹²

Present study correlates with Bhandari et al and Kapil AD et al in relation to age but not compatible with Reddy et al¹³ study which may be due to Reddy had included different cases from different geographic areas where child bearing age group may be late. This shows that younger the age, more are the possibilities of retinal changes in the eye.

In present study the gestational period ranged from 20 weeks to 36 weeks with mean 28.1 weeks (SD=4.46). So, 30% cases of gestational age <28, 37% cases of gestational age 29-32 weeks and 37% from gestational age >32 shows hypertensive retinal changes. However no significant association was found between gestational age and retinal changes which is also supported by same in Shah AP et al¹⁴ and Varija et al.¹⁵

In present study, majority of the patients were primigravida (35.06%) followed by second gravida (32.67%),

Table 2: Association between retinal changes and different variables

Age(years)	Retinal Changes		Total	Odds Ratio	Chi Square	P Value
	No Changes	Changes present				
16-20	17	21	38	0.3416	9.55	0.001
21-25	81	38	119	1.14	0.2389	0.625
26-30	53	14	67	2.317	6.486	0.01
31-35	15	5	20	1.557	0.6995	0.4029
>35	1	6	7	0.79	6.579	0.01
Gravida						
1st Gravida	51	37	88	5.387	36.5	0
2nd Gravida	11	71	82	0.209	21.99	0
3rd Gravida	11	50	61	0.354	8.62	0.002
Multigravida	11	9	20	2.634	4.526	0.04
Gestational Age(weeks)						
20-28	88	37	125	1.413	1.672	0.1963
29-32	47	28	75	0.784	0.7184	0.3967
33-36	32	19	51	0.8116	0.4126	0.5206
Proteinuria Grades						
1	91	40	131	1.316	1.058	0.305
2	55	28	83	0.9822	0.004	0.9494
3	15	12	27	0.5934	1.638	0.201
4	6	4	10	0.7463	0.1997	0.655
	167	84	251			

Thirdgravidas (24.30%) and multigravida (7.97%).

Shah AP et al in their present study of 150 patients with pre-eclampsia and eclampsia, 76 (50.67%) patients were primigravida. Of 76 patients who were primigravida, 5 (6.58%) patient developed hypertensive retinopathy. While out of 74 patients who were the multigravida, 13 (17.57%) patients developed hypertensive retinopathy. Kapil AD et al in their study observed that majority of the patients were primigravida (47.86%) followed by second gravida (20.51%), third gravid (18.80%) and multigravida (12.82%).

In all studies it is common that chances of Pre-eclampsia and Eclampsia are more in primigravida as compared to multigravida. Also, chances of hypertensive retinopathy increases in primigravida.

In our study, of 251 patients, 52.19% patient having +1 grade followed by 33.07% of +2 grade, +3 grade (10%) and +grade (4%). But no statistical significance found between grades of proteinuria and retinal changes ($p>0.05$) which is supported by Reddy et al.¹³

5. Conclusion

Grade I hypertensive retinopathy which includes arteriolar attenuation was the early and most common retinal change. Patients of eclampsia had more severe grade of hypertensive retinal changes in compare to cases of pre-eclampsia. Presentation was most common in early age group i.e. 21-25 years. Patients who where <20 years of age were three times more likely to have ocular fundus changes in

comparison to older patients. Primigravida women are at more risk of retinal changes. There is no association of proteinuria and fundus changes. Regular fundus examination in patients of pre-eclampsia and eclampsia helps early detection and proper management of maternal and fetal outcomes.

6. Source of funding

None.

7. Conflict of interest

None.

References

1. ACOG Practice Bulletin Committee. Diagnosis and management of preeclampsia and eclampsia. *Obstet Gynecol.* 2002;99:159–167.
2. Drife JO, Magowan. Clinical obstetrics and gynaecology ;
3. Report of the national high blood pressure education programme working group report on high blood pressure in pregnancy. *Am J Obstet Gynecol.* 2000;183:1–22.
4. Committee on Obstetric Practice. ACOG practice bulletin. Diagnosis and management of preeclampsia and eclampsia. *Int J Gynaecol Obstet.* 2002;33:67–75. American College of Obstetricians and Gynecologists.
5. Thadhani R, Ecker JL, Kettle E, Sandler L, Frigoletto FD. Pulse pressure and risk of preeclampsia: a prospective study. *Obstet Gynecol.* 2001;97:515–520.
6. Wagner HP. Arterioles of the retina in toxemia of pregnancy. *JAMA.* 1933;101:1380–1384.
7. Schultz KL, Birnbaum AD, Goldstein DA. Ocular disease in pregnancy. *Curr Opin Ophthalmol.* 2005;16:308–314.

8. Jaffe G, Schatz H. Ocular manifestations of preeclampsia. *Am J Ophthalmol.* 1987;103:309–315.
9. Cunningham FG, Fernandez CO, Hernandez C. Blindness associated with preeclampsia and eclampsia. *Am J Obstet Gynecol.* 1995;172:1291–1298.
10. Dutta DC. Hypertensive disorders in pregnancy. Ch. 17. In: Konar H, editor. Textbook of Obstetrics. 6th ed. vol. 1. Calcutta: New central book agency ; 2001,. p. 221–242.
11. Bhandari AJ, Bangal SV, Gogri PY. Ocular fundus changes in pre-eclampsia and eclampsia in a rural set-up. *J Clin Ophthalmol Res.* 2015;3:139–142.
12. Das AK, Jaisal P. A Study of Association of Fundus Changes in Pregnancy Induced Hypertension. *Int J Med Res Prof.* 2016;2(2):47–50.
13. Reddy SC, Sivalingam N, Rani KGS, Tham SW. Fundus changes in pregnancy induced hypertension. *Int J Ophthalmol.* 2012;5(6):694–697.
14. Shah AP, Lune AA, Magdum RM, Deshpande H, Shah AP, Bhavsar D. Retinal changes in pregnancy-induced hypertension. *Med J DY Patil Univ.* 2015;8:304–307.
15. Varija T, Vanaja D, Sindhura, Raghavenda B. A study of prevalence and association of fundus changes in pregnancy induced hypertension. *Int J Reprod Contracept Obstet Gynecol.* 2016;5:1375–1379.

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