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Professional paper

Hypertensive Retinopathy and Pre-Eclampsia

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A B S T R A C T

The aim of the study was to determine the relationship between hypertensive retinopathy and the severity of pre-eclampsia. Forty women with pre-eclampsia, mean age 29.1 (± 7.4; range, 19–44) years, were retrospectively analyzed. They were treated at the Department of Obstetrics and Gynecology of the Clinical Hospital Split, from January 1997 to December 1999. The mean age of gestation was 36.0 ± 2.8 weeks (range, 28–39). Pre-eclampsia was classified according to Goecke. Based on the ophthalmoscopic fundus examinations the patients were divided into four groups, according to Keith–Wagner classification system of grading retinal changes. Of 40 analyzed women, 18 (45%) had ophthalmologically verified hypertensive retinopathy. Ten of them were classified as grade I, six as grade II and two as grade III. Twenty-two patients had mild pre-eclampsia, ten patients had moderate pre-eclampsia, and eight patients had severe pre-eclampsia. A statistically significant correlation (t-test) was found between the degree of hypertensive retinopathy and patient age, Apgar score, trophism, Goecke's index, proteinuria, systolic and diastolic pressure ($P < 0.001$) and edema ($P = 0.01$). The degree of hypertensive retinopathy was directly proportional with the severity of pre-eclampsia and significant correlation was found between them ($r = 0.338$, $p = 0.033$). These findings showed that the degree of hypertensive retinopathy in women with pre-eclampsia is a valid and reliable prognostic factor in determining the severity of the pre-eclampsia. Therefore, it can be concluded that the examination of the fundus is a valuable and necessary diagnostic procedure in pregnant women with pre-eclampsia.

Introduction

Pre-eclampsia is a specific pregnancy disorder, which occurs in late pregnancy and has potentially devastating consequences for both mother and baby. Pre-eclampsia usually occurs in late pregnancy, primarily in primigravidas[1]. This systemic disease can affect almost every organ system in the body. Pregnancy can cause changes in the eye in healthy women as well as in patients suffering from different diseases, just as it modifies other non-reproductive systems of the body[2].

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Pre-eclampsia is characterized by edema, proteinuria, and hypertension. Whereas the assessment of edema is subjective, significant proteinuria is defined as > 0.3 g protein/24 hour or 0.1 g/L (> 2 + on the dipstick), in at least two random samples collected 6 or more hours apart. Hypertension, according to the American College of Obstetricians and Gynecology Committee on Terminology, is defined as either a systolic pressure of ≥ 140 mmHg or an increase of ≥ 30 mmHg (from a baseline in the first half of the pregnancy) or as a diastolic pressure of ≥ 90 mmHg or an increase of ≥ 15 mmHg[3,4].

The aim of the study was to investigate a correlation between systolic pressure, diastolic pressure, proteinuria and edema *vs.* hypertensive retinopathy grade, as well as the correlation between patient age, trophism, and Apgar of the child in the fifth minute and the hypertensive retinopathy grade.

Material and Methods

This is a retrospective study of 40 pregnant women with pre-eclampsia, aged 29.1 ± 7.4 (range, 19–44) years treated at the Department of Obstetrics and Gynecology of the Clinical Hospital Split, from January 1997 to December 1999. The mean age of gestation was 36.0 ± 2.8 weeks (range, 28–39). Fundus examinations were done using ophthalmoscope. Pregnant women with pre-eclampsia but without fundus examinations, as well as those with diabetes and/or hypertension in their medical history, were not included in the study. Pre-eclampsia was classified according to Goecke, from 1 to 11 (Table 1)[5].

Based on ophthalmoscopic examination of the fundus 40 pre-eclamptic women with hypertensive retinopathy (stages I–IV) were divided into four groups, according to the Keith-Wagner classification system of grading retinal changes[6].

Medical histories of 40 pregnant women with pre-eclampsia, who delivered babies between 28th and 39th week of gestation, evaluated according to Apgar in the fifth minute from 0 to 10, were examined.

Results were analyzed using the Statistica for Windows, release 5.0 (Stat Soft, Inc, Tulsa, USA). Statistical analyses were performed by the use of descriptive statistics and t-test. P values lower than 0.05 were considered significant.

Results

The descriptive statistics of patients' age, gestation, Goecke's index, hypertensive retinopathy and Apgar score are given in Table 2.

Out of 40 examined pre-eclamptic women, 18 (45%) had ophthamoscopically

TABLE 1
PRE-ECLAMPSIA CLASSIFICATION ACCORDING TO GOECKE

Analyzed Parameters	0	1	2	3
Resting Edema	Absent	Tibial	Generalized	–
Proteinuria	< 0,5	0,5–2	2–5	> 5
Pressure: systolic	< 140	140–160	160–180	> 180
diastolic	< 90	90–100	100–110	> 110

< 3 = moderate pre-eclamptic toxemia
4–7 = mild pre-eclamptic toxemia
8–11 = severe pre-eclamptic toxemia

TABLE 2
DESCRIPTIVE STATISTICS OF PATIENTS' AGE, GESTATION PERIOD, GOECKE'S INDEX, HYPERTENSIVE RETINOPATHY AND APGAR SCORE

	Age (yrs)	Gestation (week)	Goecke's index	Hypertensive retinopathy (degree)	Apgar score in 5th min
Mean	29.1	36.1	5.9	0.7	7.1
± SD	7.4	2.9	2.6	0.9	3.3
Range	19–44	28–39	2–11	0–3	0–10

verified hypertensive retinopathy according to Keith–Wagner classification system of grading retinal changes. Ten of them had grade I, six of them grade II and two of them grade III. Ten patients had moderate pre-eclampsia (index 1–3), 22 patients had mild pre-eclampsia (index 4–7), and 8 patients had severe pre-eclampsia (index 8–11) (Table 3).

A statistically significant correlation was determined between the grade of hypertensive retinopathy and the severity of pre-eclampsia (P = 0.033).

The statistically significant correlation between patients' age, Goecke's index, edema, proteinuria, systolic and diastolic pressure and the degree of hypertensive retinopathy are shown in Table 4

TABLE 3
THE CORRELATION BETWEEN THE DEGREE OF HYPERTENSIVE RETINOPATHY (ACCORDING TO KEITH-WAGNER CLASSIFICATION) AND THE SEVERITY OF PRE-ECLAMPSIA (ACCORDING TO GOECKE)

Hypertensiveretinopathy	Gestosis index			
(degree)	1–3	4–7	8–11	Total
0	8	10	4	22
I	2	6	2	10
II	0	4	2	6
III	0	2	0	2
Total	10	22	8	40

TABLE 4
THE STATISTICALLY SIGNIFICANT CORRELATION BETWEEN PATIENTS' AGE, GOECKE'S INDEX, EDEMA, PROTEINURIA, SYSTOLIC AND DIASTOLIC PRESSURE AND THE DEGREE OF HYPERTENSIVE RETINOPATHY

Degree of hypertensive retinopathy vs.	T-test	P significance
Age	24.27	< 0.001
GI	12.1	< 0.001
Edema	2.635	= 0.01
Proteinuria	2.8	< 0.001
Systolic pressure	4.629	< 0.001
Diastolic pressure	5.033	< 0.001
Apgar at 5th min.	11.767	< 0.001
Trophism	3.54	< 0.001

($P < 0.001$). There was a weaker correlation between the edema and the degree of hypertensive retinopathy ($P = 0.01$).

Discussion

Pre-eclampsia causes numerous ocular abnormalities and can have a potential impact on ocular fundus[7]. The systemic nature of pre-eclampsia and its capacity to affect many organ systems is well documented. It can also rapidly progress to life-threatening events, which include convulsions (eclampsia) and syndromes characterized by disseminated clotting abnormalities, thrombocytopenia and liver rupture or failure. It is of great importance to determine the degree of pre-eclampsia in each particular patient[6].

In this study, we tried to determine a correlation between the grade of the hypertensive retinopathy and the severity of pre-eclampsia. We found a statistically significant correlation between the severity of pre-eclampsia and the degree of hypertensive retinopathy. Our findings are in agreement with the results obtained from several other studies[8–11]. However, our study differs from similar studies that were assessing the severity of pre-eclampsia only according to blood pressure measurements, but without considering Goecke's index. We found statistically significant correlation between the systolic pressure, diastolic pressure, proteinuria and edema and hypertensive retinopathy ($P < 0.01$). The weakest correlation was found between the hypertensive retinopathy and edema, which is a finding similar to that reported by other authors[12,13]. We also found a statistically significant correlation between the degree of hypertensive retinopathy and the age of the mother ($P < 0.001$). Older mothers had a higher degree of hypertensive retinopathy[14,15], which is in agreement with earlier reports.

Conclusion

A statistically significant correlation between the degree of hypertensive retinopathy and the severity of pre-eclampsia was found. The degree of hypertensive retinopathy is closely related to the appearance of the edema, proteinuria, systolic pressure and diastolic pressure.

Our findings suggest that the degree of hypertensive retinopathy in women with pre-eclampsia is a valid and reliable prognostic factor that gives a valid prognostic information on assessment of the severity of pre-eclampsia and neonatal outcome. Therefore, the examination of ocular fundus proved to be a valuable and necessary diagnostic procedure in determining the cause and appropriate treatment for mothers with pre-eclampsia.

REFERENCES

1. CUNNIGHAM, F. G., P. C. MACDONALD, N. F. GANT, K. J. LEVENO, III. L. C. GILSTRAP, G. D. V. HANKINS, S. L. CLARK: Williams Obstetrics. (Appleton & Lange, Stamford – Connecticut, 1997). — 2. SUNNESS, J. S., Surv. Ophtalmol., 32 (1988) 219. — 3. KURJAK, A.: Textbook of Perinatal Medicine. (Parthenon Publishing, London – New York, 1998). — 4. REECE, E. A., C. J. HOBBINS, M. J. MAHONEY, R. H. PETRIE: Medicine of the Fetus & Mother. (J. B. Lippincott Company, Philadelphia, 1995). — 5. GOECKE, C., G. SCHWABE, Zbl. Gynäkol. 87 (1965) 1439. — 6. LARAGH, J. H., B. M. BRENNER: Hypertension. (Raven press, New York, 1995). — 7. SCOTT, J. R., P. J. DiSAIA, C. B. HAMMOND, W. N. SPELLACY: Danforth's Obstetrics and Gynecology. (Lippincott-Raven, Philadelphia, New York, 1997). — 8. JÜRGENS, H., R. DICHMANN, Zentralbl. Gynakol., 97 (1975) 1201. — 9. DUKE–ELDER, S., J. H. DOBREE, System of Ophthalmology., 10 (1967) 350. — 10. SADOWSKY, A., D. M. SERR, J. LANDAU, Obstet. Gynecol., 8 (1956) 426. — 11. RISS, B., P. RISS, M. METKA, Z. Geburtsh. Perinat., 187 (1983) 276. — 12. WENZEL, M., H. LEHNEN, Acta. Ophtalmol., 72 (1994) 391. — 13. SCHLOTE, H. W., H. D.

EIKEL, Dtsch. Gesundheitsw., 26 (1971) 120. — 14. JAFFE, G., H. SCHATZ, Am. J. Ophtalmol., 103 (1987) 309. — 15. SAITO, Y., T. OMOTO, K. KIDOGUCHI, T. FUJITA, Y. WADA, Nippon. Ganka. Gakkai. Zasshi., 94 (1990) 870.

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HIPERTENZIVNA RETINOPATIJA I EPH GESTOZA

S A Ž E T A K

Cilj ovog rada bio je ispitati povezanost stupnja hipertenzivne retinopatije i težine EPH gestoze. Retrospektivno je promatrano 40 trudnica s preeklampsijom, u dobi od 29.1 (± 7,4; 19–44) godina, u Klinici za ženske bolesti i porode u Splitu, od siječnja 1997. do prosinca 1999. godine. Srednja gestacijska dob bila je 36.0 ± 2.8 (28–39) tjedana. EPH gestoza klasificirana je prema Goeckeu. Na osnovu oftalmoskopskih nalaza, 40 trudnica s gestozom podijeljeno je u četiri skupine, u skladu s Keith-Wagnerovom klasifikacijom stupnjevanja retinalnih promjena. Od 40 promatranih trudnica s preeklampsijom, 18 (45%) ih je imalo oftalmoskopski dijagnosticiranu hipertenzivnu retinopatiju. Deset ih je imalo HR I stupnja, šest II stupnja, dok su dvije trudnice imale HR III stupnja. Deset pacijentica imalo je lakši oblik gestoze, 22 srednji i 8 teži. Postoji statistički signifikantna povezanost (t-test) između stupnja hipertenzivne retinopatije i dobi, Goeckovog indeksa, edema, proteinurije, sistoličkog i dijastoličkog tlaka te Apgara djeteta u 5. minuti i trofičnosti ($P < 0.001$, osim za edem $P < 0.05$). Visina stupnja hipertenzivne retinopatije u trudnica upravo je proporcionalna i značajno korelira s težinom preeklampsije ($r = 0.338$; $p = 0.033$). Ovi podaci ukazuju da je stupanj hipertenzivne retinopatije u žena s EPH gestozom vrijedan prognostički čimbenik težine gestoze i neonatalnog ishoda. Stoga možemo zaključiti da je ispitivanje očnog fundusa vrijedna i nezaobilazna dijagnostička pretraga kod trudnica s EPH gestozom.