

Chronic Glomerulonephritis and Pregnancy

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Abstract

Background. Chronic glomerulonephritis is the chronic nephropathy which is present also in pregnant women. The effect of pregnancy depends on the histological type of glomerulonephritis, of presence of hypertension and systemic disease, of renal function and superimposed other disease.

Aim of the study was to investigate if the pregnancy influences the renal function in patients suffering from chronic glomerulonephritis.

Methods. In prospective study we investigated 20 women (mean age was 25±4 years) suffering from chronic glomerulonephritis with normal glomerular filtration rate, before and during the pregnancy and after the delivery in puerperium. Renal biopsy was performed in 11 patients before the beginning of pregnancy. Two of them suffered from chronic intracapillary minimal changes nephropathy, 8 women suffered from mesangioproliferative glomerulonephritis, and two of them simultaneously suffered from chronic tubulointerstitial nephritis. A next one suffered from membranoproliferative glomerulonephritis with nephrotic syndrome. Preeclampsia occurred in 4 patients.

Results. Renal functional tests did not significantly change during the pregnancy in 15 patients. In 4 patients suffered from preeclampsia superimposed on chronic glomerulonephritis blood pressure, proteinuria and serum uric acid transitory significantly increased in the third trimester of pregnancy. The woman suffered from acute renal failure during the first three months of pregnancy caused by significant urinary E.coli infection was successfully treated by conservative and antibiotic treatment. Spontaneous abortus occurred in one woman without severe haemorrhage in the second trimester of pregnancy. Spontaneous delivery was observed in 15 women. Delivery Caesarian was performed in 4 women and the indication was from obstetrical point of view. After the delivery in puerperium the renal functional tests did not show a significant change against the values before pregnancy in all 19 patients.

Conclusions. It was concluded that pregnancy did not influence the course of chronic glomerulonephritis in women who had normal renal function at the conception.

Keywords: chronic glomerulonephritis; hypertension; renal function; pregnancy; preeclampsia

Introduction

Chronic glomerulonephritis (CG) is one of the chronic nephropathy, which is often present also in pregnant women. According to some nephrologists pregnancy has damaging effect on renal function in primary glomerulonephritis but the evidence is conflicting. The effect of pregnancy on CG depends on the histological type of glomerulonephritis, presence of hypertension and systemic disease, depends on superimposed other disease and on renal function [1-8]. Coagulation changes in pregnancy can lead to the exacerbation of CG especially of IgA nephropathy, focal segmental glomerulosclerosis and membranoproliferative glomerulonephritis [9]. Of the highest prognostic values were the level of beta-thrombolobulin and fibronectin, the activity of the intrathrombotic LDH and platelet aggregation in response to ADP. Correction of endothelial-platelet state with acetylsalicylic acid and dipyridamol was effective in prevention of fetal retardation and fetal loss in pregnant women with CG [10-12].

The purpose of the study was to investigate the renal function in women before and during the pregnancy, after the delivery in puerperium.

Patients and methods

In prospective study we investigated 20 women (mean age was 25±4 years) suffering from CG. In those patients were CG diagnosed before the pregnancy and were followed during pregnancy, delivery and puerperium. Renal biopsy was performed in 11 patients before the beginning of pregnancy (2 women suffered from intracapillary minimal changes nephropathy, 8 women suffered from mesangioproliferative CG and 2 of them simultaneously suffered from chronic tubulointerstitial nephritis and next one suffered from membranoproliferative CG with nephrotic syndrome). Simultaneous tubulointerstitial nephritis was diagnosed in one woman using renal biopsy and in the second one by renal functional tests during acute renal failure caused by significant urinary E.coli infection. Preeclampsia was superimposed on CG in 4 patients. Patients were investigated by nephrologist and by obstetrician every month during the pregnancy, and after the delivery in puerperium. Renal functional tests were investigated 1-3 months before

the conception, in the second and third trimester of pregnancy and at the end of puerperium. Glomerular filtration rate was estimated from creatinine clearance and proteinuria was determined by photometric method using Biuret reagent. Statistical analysis of the obtained results was performed using Student t-Test.

Results

Clinical and laboratory parameters before and during the pregnancy, and after the delivery from nephrological and obstetrical points of view are depicted in Table 1, 2.

Table 1. Clinical and laboratory parameters before and during the pregnancy, and after the delivery in 20 women suffered from chronic glomerulonephritis

Time of investigation	Blood pressure (kPa)	Serum creatinine ($\mu\text{mol/L}$)	GFR (ml/s)	Proteinuria (g/day)	Addis urinary sediment (thousand/min)	Significant bacteriuria ($10^4/\text{ml}$) (n)
Before pregnancy (n=20)	16.3/11.4 ± 1.4/0.95	80.5±7.9	1.93±0.25	0.89±0.27	Er: 18.06 ± 4.20 Le: 15.28 ± 2.77 Casts: 0.50 ± 0.07	6
Second trimester (n=19)	17.0/11.6 ± 1.3/ 1.0	87.5±9.2	1.78±0.22	0.97±0.19	Er: 19.05 ± 3.85 Le: 16.43 ± 3.10 Casts: 0.50 ± 0.08	4
Third trimester (n=15)	17.5/12.0 ± 1.2/1.0	88.9±8.5	1.75±0.30	0.95±0.15	Er: 20.83 ± 2.77 Le: 18.06 ± 4.17 Casts: 0.69 ± 0.04	4
After delivery (n=19)	17.7/11.7 ± 1.3/1.2	88.2±10	1.64±0.30	1.02±0.01	Er: 12.50 ± 5.57 Le: 11.11 ± 4.20 Casts: 0.28 ± 0.01	5

GFR – glomerular filtration rate;

n=15 (number of patients without 4 patients with superimposed preeclampsia on chronic glomerulonephritis)

Table 2. Pregnancy in 20 women suffered from chronic glomerulonephritis

Number of patients	Number of pregnancy	Abortus spontaneous	Delivery			Newborn	
			spontaneous	inductive	operative	euthrophic	hypothrophic
20	20	1	14	1	4	15	4

Haematocrit before the pregnancy was 0.38 ± 0.02 and after the delivery was 0.37 ± 0.02 . In 4 patients with preeclampsia superimposed on CG, which occurred in the third trimester of pregnancy, the serum uric acid concentration was higher than in the remaining 15 patients in CG group ($490.5\pm 55 \mu\text{mol/L}$ vs $320\pm 63 \mu\text{mol/L}$; $p<0.01$), [13]. Diet with reduction of salt was used in 4 patients with leg edema and with significant hypertension. Transitory low protein diet was used in a woman during acute renal failure which occurred in the first three months of pregnancy. The patient with acute renal failure caused by urinary E.coli infection was successfully treated by conservative and antibiotic

therapy. Thiazide diuretic and antihypertensive drug (beta-blocker) were used in 4 patients, acetylsalicylic acid and dipyridamol were used in 5 patients (6) and other therapy was used in 7 patients. Corticosteroid and immunosuppressive drugs were not used. From obstetrical point of view we observed spontaneous abortus in one woman without significant complication. Spontaneous delivery was observed in 14 women, inductive delivery in one woman, delivery Caesarian was performed in 4 women. The Caesarian delivery was performed from obstetrical indication.

Discussion

Renal functional tests did not significantly change in women suffering from CG during the pregnancy (3,5,6,9) besides 4 women with superimposed preeclampsia. Superimposed preeclampsia of pregnancy on CG was manifested in 4 women by transitory leg edema, by significant elevation of hypertension ($18.7/12.0 \pm 1.2/1.0$ vs $20.8/12.5 \pm 1.1/0.5$; $p < 0.05$), by further increase of proteinuria (0.90 ± 0.12 vs 1.32 ± 0.1 g/day, $p < 0.01$), and by the increase of serum uric acid. Serum creatinine and GFR did not change significantly and the values were in normal range. No neurological signs of superimposed preeclampsia on CG in our patients were present. After the treatment by antihypertensive and diuretic drugs the clinical and laboratory parameters improved and led to the previous levels. Our results are in the agreement of Katz and Undheimer [9], that the incidence of preeclampsia seems to be higher in pregnant women suffering from CG. According to Yoshida *et al* [13] serum uric acid is higher in preeclampsia than in women with CG during pregnancy. We found the increased value of serum uric acid in 4 patients with preeclampsia superimposed on CG in the third trimester of pregnancy. In the last years it was recommended to investigate several circulating serum angiogenic factors in the onset of preeclampsia. Placental growth factor concentration was lower, soluble fms-like tyrosine kinase 1 concentration was higher in women with preeclampsia, gestational proteinuria and it also was higher in women with preeclampsia superimposed on CG [14]. These are very important findings in differential diagnosis of renal diseases during pregnancy. In one woman suffering from membranoproliferative CG and nephrotic syndrome was necessary to administer repeatedly infusion of 20% albumin and thiazide diuretic drug [3]. Significant bacteriuria (10^4 /ml) in patients was treated by antibiotics before and during the pregnancy and after the delivery. From obstetrical point of view abortus spontaneous without severe haemorrhage was observed in one patient in the second trimester of pregnancy. The course of pregnancy was successful without significant complications in 19 patients until the delivery.

Conclusions

1. Renal functional tests after the delivery in puerperium did not significantly change in all women suffered from CG in comparison to the tests before the pregnancy, despite of the presence of superimposed preeclampsia in 4 patients and of significant bacteriuria in 4 patients during the pregnancy. Blood pressure, proteinuria and serum uric acid transitory significantly increased in the third trimester of pregnancy in 4 patients with superimposed preeclampsia on CG. After the delivery in puerperium the renal functional tests did not show a significant change against the values before pregnancy.
2. From obstetrical point of view we observed spontaneous abortus in one woman, spontaneous delivery was in 14 women, inductive delivery was in one woman. Delivery Caesarian was performed in 4 women, the indication was

from obstetrical point of view. Hypothrophic newborn was observed in 4 women.

3. We conclude that pregnancy did not influence the course of CG in women without significant hypertension and with normal renal function at conception.

Conflict of interest statement. None declared.

References

1. Mydlik M, Fric I, Jurkovic I, *et al.* Lupus erythematosus and pregnancy. *Vnitř Lek* 1972; 18: 328-32.
2. Takeda S, Kida H, Takasawa K *et al.* Influences of pregnancy on the natural cause of chronic glomerulonephritis with impaired renal function. *Nippon Jinzo Gakkai Shi* 1991; 33: 803-10.
3. Wielgosz A, Zdrojewski Z. Pregnancy in women with nephrotic syndrome in the course of chronic glomerulonephritis. *Pol Tyg Lek* 1984; 39: 1309-11.
4. Rychlik I. Pregnancy in women with the renal disease. *Akt Nefrol* 2005; 11: 89-91.
5. Jungers P, Houillier P, Forget D *et al.* Influence of pregnancy on the course of primary chronic glomerulonephritis. *Lancet* 1995; 346: 1122-4.
6. Rogov VA, Tareeva IE, Sidorova IS *et al.* Acetylsalicylic acid and kurentil in the prevention of pregnancy complications in glomerulonephritis and hypertension. *Ter Arkh* 1993; 65: 65-8.
7. Pozzi C, Limardo M. Does pregnancy influence the course of IgA nephropathy? Proposal for an observational study. *J Nephrol* 2006; 19: 192-5.
8. Brown MA, Holt JT, Mangos GJ *et al.* Microscopic hematuria in pregnancy: relevance to pregnancy outcome. *Am J Kidney Dis* 2005; 45: 667-73.
9. Katz AI, Undheimer MD. Kidney disease and hypertension in pregnancy. pp 1148-1165. In: Massry SG, Glasscock RJ. Textbook of Nephrology. Vol. 2. Third Edition. Baltimore and al. *Williams & Wilkins* 1995, 2025 p.
10. Rogov VA, Shilov EM, Kozlovskaja NL *et al.* Endothelium and platelets in pregnant women with chronic glomerulonephritis and therapeutic efficacy of acetylsalicylic acid and dipiridamol. *Ter Arkh* 2004; 76: 58-64.
11. Rogov VA, Shilov EM, Kozlovskaja NL *et al.* Chronic glomerulonephritis and pregnancy. *Ter Arkh* 2004; 76: 21-6.
12. Kozlovskaja NL, Tareeva IE, Krylova MIu *et al.* Platelet dysfunction and pregnancy in gestational exacerbation of chronic glomerulonephritis. *Ter Arkh* 1999; 71: 43-5.
13. Yoshida A, Morozumi K, Yagami Y. Pregnancy in patients with chronic glomerulonephritis. *Nippon Sanka Fujinka Gakkai Zasshi* 1988; 40: 365-72.
14. Masuyama H, Suwaki N, Nakatsukasa H *et al.* Circulating angiogenic factor in preeclampsia, gestational proteinuria and preeclampsia superimposed on chronic glomerulonephritis. *Am J Obstet Gynecol* 2006; 194: 551-6.