Renal disease in pregnancy

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Summary

In this review the need for early antenatal assessment of renal disease is stressed as is the need to follow-up all patients in the puerperium in whom renal dysfunction has been suspected during pregnancy. A variety of renal disorders and their effect on the outcome of pregnancy are discussed.

Introduction

Pregnancy has been described as a test of renal function. As is known, quite remarkable changes in renal function accompany normal pregnancies, so that some knowledge of these changes is important when assessing clinical and biochemical abnormalities at any given time during gestation. The main difficulties in obtaining good renal assessment in pregnancy are due to the constraints which almost preclude meticulous radiological investigations, e.g. intravenous urography and arteriography. Renal biopsies, though they are sometimes performed, can be technically difficult and are not without dangers. Tests are, therefore, limited to those on the patient's blood and urine with perhaps some assistance from ultrasonic and radioactive scanning techniques.

In considering any pregnant woman with renal disease, the physician should always think in terms of:

- (1) the possible effect the renal disease might have on mother and fetus;
- (2) the effect (if any) which the pregnancy might have on the mother's renal condition.

Special care of the pregnant mother with known renal disease goes without saying, but difficulties often arise where underlying renal abnormalities had not previously been suspected. This is where good antenatal care plays such an important role.

As a general rule, mild renal abnormalities as evidenced by proteinuria only, carry minimal risk to both mother and fetus, but the presence of hypertension and/or impaired glomerular filtration rate cause a steep rise in fetal morbidity and mortality. The development of severe hypertension may also have an adverse effect on maternal renal disease. Advanced renal failure is usually associated with infertility but occasionally conception does take

place only for abortion to occur within the first 12 weeks. Rarely will a pregnancy survive to full term in such situations (Herwig *et al.*, 1965). It is usually claimed that toxæmia of pregnancy is common in patients with underlying renal disease (or urinary tract infections) but the 2 conditions may be notoriously difficult to distinguish. Clearly any renal disorder brought to light during pregnancy should be followed-up after parturition so that its nature can be clearly defined and further obstetric excursions planned well in advance.

Pre-eclampsia

No discussion of renal disease in pregnancy would be complete without some mention of this subject, for the kidneys are for once the victims and not the initiators of this condition. Although many factors probably play a part, the main renal features are related to the effects of disseminated intravascular coagulation resulting in swelling of glomerular endothelial and mesangial cells and the deposition within capillary loops of fibrin-platelet microthrombi. These intrarenal changes may in turn contribute to salt and water retention and hypertension which are part of the syndrome of pre-eclampsia.

These glomerular lesions are usually considered to be completely reversible but in some cases irreversible arteriolar necrosis may occur which results in persistent hypertension (Dennis, McIver and Smythe, 1968; Epstein, 1964).

Glomerular disease

Acute glomerulonephritis

Completely healed acute glomerulonephritis carries no added risk to pregnancy. However, pregnancy occurring within one to 2 years of an acute glomerulonephritic episode is said to carry an increased risk of complications. Rarely, acute glomerulonephritis can occur *de novo* during pregnancy, in which case fetal mortality is very high (Wilson, 1958).

Chronic glomerulonephritis

If proteinuria is the only index of glomerulonephritis no adverse effects on mother or fetus can

be expected but the association of hypertension carries a significant risk of fetal death. This is further increased if the glomerular filtration rate is reduced (Kaplan, Smith and Tillman, 1962).

Kincaid-Smith, Fairley and Bullen (1967) showed a similar increase in fetal mortality related to maternal biopsy findings and, furthermore, showed deterioration in overall renal function in 46% of mothers with diffuse glomerular disease. These authors found that fetal mortality was 50% in patients with blood urea levels in excess of 8.3 mmol/l.

Nephrotic syndrome (primary or secondary)

As in other forms of glomerulonephritis, the level of blood pressure and glomerular filtration rate are of paramount importance. The proteinuria and oedema can generally be managed with the help of diuretics and albumin infusions. Fetal dysmaturity is often correlated with plasma albumin levels as well as the height of the blood pressure (Studd and Blainey, 1969).

Patients on steroid therapy usually tolerate pregnancy well, provided the nephrotic syndrome is under control.

Nephrotic syndrome secondary to diabetes mellitus or systemic lupus erythematosus (SLE) have their own problems and fetal mortality is usually fairly high.

Connective tissue disorders

Women with polyarteritis nodosa and SLE may become pregnant. Reports are conflicting but it seems that the majority of patients with SLE can have successful pregnancies if the disease is controlled with steroids. In some cases, the disease can be exacerbated by pregnancy and in others deterioration of renal function has been observed in the puerperium (Garstein, Pollak and Kark, 1962).

Urinary tract infections

The incidence of a symptomatic bacteriuria in the pregnant population has been found to be 4–7%. The incidence appears to increase with age and multiparity. Several factors may be aetiologically important, e.g. ureteric dilatation and urinary stasis, renal glycosuria, potassium deficiency, endocrine factors and the presence of pre-existing renal disease.

The presence of bacteriuria in early pregnancy carries a significant risk of acute pyelonephritis and hypertension later in pregnancy (Whally, 1967), and adequate treatment will prevent 75–85% of such attacks (Norden and Kass, 1968). In a comparative study, Condie *et al.* (1968) found an incidence of 23% of acute pyelonephritis in 86 untreated bacteriurics compared with 10% in 87 treated patients.

In Little's series (1966), 25% of untreated patients developed pyelonephritis whereas only 3% of treated patients did so.

The likelihood of prematurity in bacteriuric patients has been observed (Kincaid-Smith, 1968) and this was shown by Little (1966) to be more frequent in those whose infection was difficult to eradicate.

Hypertension requires careful treatment, for, if uncontrolled, the danger of prematurity and fetal death will be considerable.

Follow-up i.v. urograms in bacteriuric patients after the completion of pregnancy have shown a high incidence of urogenital abnormalities (Kincaid-Smith and Bullen, 1965a, b) and there seems to be a significantly higher incidence of abnormalities in patients where difficulty had been found in eradicating urinary infection (Sidaway, 1968).

Treatment

Intermittent or continuous treatment with appropriate antibiotics have their advocates. The decision is often based on the ease of follow-up and incidence of recurrent infections. Care should be exercised in the choice of antibiotics, and those toxic to mother and fetus should be excluded. Regular follow-up with repeated urine cultures must be performed during the course of pregnancy.

Urinary tract calculi

Stasis and infection in the urinary tract can predispose to stones. On the other hand, renal calculi may well be an important factor in patients with repeated infections, particularly with organisms of *Proteus* sp.

Dilatation of the ureters usually allows the asymptomatic passage of stones during pregnancy, but if they are arrested during their course down the ureter, the classical symptoms of colicky pain, nausea, vomiting, fever, dysuria and haematuria will occur. A single abdominal X-ray may be justified under the circumstances and a decision as to operate or not will depend upon the size and position of the stone.

Acute renal failure

This is a well recognized complication of pregnancy that is fortunately becoming a rarity thanks to improved antenatal supervision and prompt correction of pre-renal factors. Nevertheless, occasionally sepsis, haemorrhage and disseminated intravascular coagulation develop, resulting in oliguria which may need intensive dialysis treatment. Although acute renal failure in pregnancy carries a relatively good maternal prognosis, severe damage to renal cortical tissue may follow an acute Schwartzman reaction associated with antepartum haemorrhage. Intense

cortical vasoconstriction can lead to superimposed cortical necrosis, but with modern dialysis treatment the majority of cases will survive and, because of the patchy nature of the condition, will recover adequate function, although persistent hypertension may be a sequel.

Postpartum renal failure

This rare condition which was described by Robson *et al.* (1968) develops within 6 weeks of a normal delivery. The renal abnormalities are confined to the glomeruli and arterioles and consist of diffuse necrosis secondary to intravascular coagulation. The cause of this usually irreversible condition is not known.

Congenital renal diseases

Polycystic disease, ectopic positioning of kidneys, and neurogenic disturbances are all potential sources of trouble during pregnancy, owing either to infection or obstructed labour. Careful monitoring of renal function and urinary cultures are therefore vital.

Renal transplantation

Many cases of successful pregnancies to mothers with renal transplants have been published (Golby, 1970). From the author's own small experience of 5 pregnancies in 4 patients, 3 were completely uneventful, in one, mild hypertension and proteinuria occurred and, in another, deterioration in renal function. No serious urinary tract complications were seen and all were delivered by Caesarean section. There have been no adverse effects of the immunosuppressive drugs on the infants.

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