

# Pericardiectomy in pregnancy

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Details are presented which relate to a patient in whom constrictive pericarditis developed during pregnancy. Successful pericardiectomy was performed at 24 weeks' gestation and a normal infant was delivered at term. The results of medical and surgical treatment of cardiac patients during pregnancy, the results of pericardiectomy, and the risk to the foetus are discussed.

The range of cardiac surgery in pregnancy has been extended from procedures such as mitral valvulotomy and repair of aortic coarctation to include a variety of 'open-heart' operations undertaken with the aid of cardiopulmonary bypass (Ueland, 1965; Zitnik, Brandenburg, Sheldon, and Wallace, 1969). Rheumatic and congenital lesions are the forms of heart disease most frequently encountered in pregnancy (Ueland, 1965), and correction of these lesions has therefore been the type of operation most commonly undertaken.

Constrictive pericarditis is a common lesion in those parts of the world where tuberculosis is uncontrolled. Many patients with tuberculosis are infertile, so that the occurrence of pregnancy in patients with constrictive pericarditis is relatively rare. The purpose of this paper is to report the details which relate to a patient in whom pericardiectomy was undertaken in pregnancy.

## CASE REPORT

A 30-year-old Bantu woman was admitted to hospital with a four months' history of dyspnoea, oedema, and pleuritic chest pain. There was no antecedent history of heart disease nor of disability in two previous normal pregnancies. Her mother had had pulmonary tuberculosis. The patient was ill, emaciated and dyspnoeic and had peripheral oedema and bilateral pleural effusions. She was in sinus rhythm with a heart rate of 150 beats per minute; there was pulsus paradoxus (expiration=110/85 mm. Hg; inspiration=98/80 mm. Hg) and the jugular veins were distended for 8 cm. above the sternal angle with prominent 'a' and 'v' waves and 'x' and 'y' troughs. The heart on palpation was quiet; on auscultation sudden reduplication of the second heart sound occurred early in inspiration and there was an early

third heart sound. The liver was palpable 9 cm. below the right costal margin, and the spleen 1 cm. below the left. The fundus of the uterus was felt 3 cm. below the umbilicus, consistent with the twenty-fourth week of pregnancy. Foetal heart sounds were normal.

Laboratory investigations showed a haemoglobin of 10.5 g./100 ml.; a white cell count of 6,000 per cu. mm.; an erythrocyte sedimentation rate of 51 mm. in the first hour; and a blood urea of 18 mg./100 ml. A tuberculin test was positive.

The electrocardiogram (Fig. 1) showed sinus tachycardia, at a rate of 125 per minute, and a mean frontal QRS axis of  $+10^\circ$ , low voltage in the standard leads and generalized ST-T wave depression or inversion. The chest radiograph (Fig. 2) showed bilateral pleural effusions, a heart shadow with a

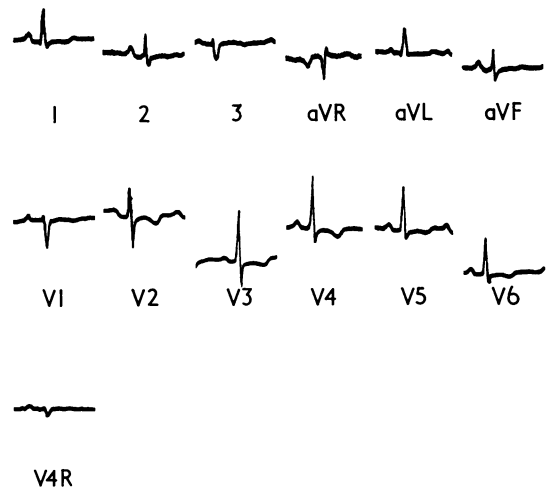


FIG. 1. ECG showing sinus tachycardia, normal axis, low voltage in the standard leads and generalized ST-T wave changes in keeping with constrictive pericarditis.

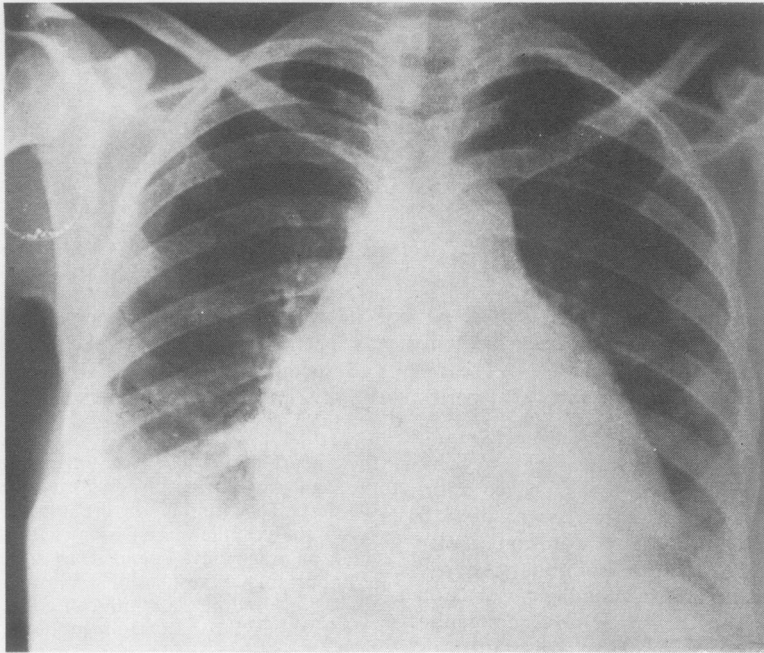


FIG. 2. Chest radiograph showing small bilateral pleural effusions, a cardiac shadow with a shaggy outline, cardiothoracic ratio of 55% and pulmonary venous hypertension and congestion.

shaggy outline and a cardiothoracic ratio of 55% with pulmonary venous congestion.

A diagnosis of tuberculous pericarditis with constriction, in pregnancy, was made. Initial treatment was with digitalis, diuretics, anti-tuberculosis therapy (streptomycin, 1 g. per day intramuscularly; para-aminosalicylic acid, 4 g., t.d.s.; and isoniazid, 100 mg., t.d.s.), vitamin B complex and pyridoxine, 100 mg., b.d.

Deterioration in the patient's clinical state occurred suddenly two days after admission to hospital; she became hypotensive and there were signs of a low cardiac output. Right heart catheterization and angiography were undertaken to exclude a cardiomyopathy of pregnancy, a lesion commonly encountered in our clinical practice. Brachial artery pressure was recorded using an intra-arterial needle. Screening was limited to the chest and the abdomen was shielded with a lead plate. Although the pressures recorded (Table) were not grossly abnormal, the degree of pulsus paradoxus indicated severe constriction; it is probable that the patient moved her position on the catheter table to make herself more comfortable and that the zero reference level was, therefore, placed incorrectly. A right heart angiogram was performed and cineradiography was continued until the laevogram phase had been recorded; this showed small cardiac chambers with marked restriction of

TABLE  
PRESSURES RECORDED AT CATHETERIZATION<sup>1</sup>

Site	Pressures (mm.Hg)	
	S/D	Mean
Right atrium .. .. .		4
Right ventricle .. .. .	24/3	
RV end diastole .. .. .	6	
Pulmonary artery .. .. .		11
Pulmonary wedge .. .. .		7
Brachial artery		
Expiration .. .. .	115/74	
Inspiration .. .. .	68/62	

<sup>1</sup> Baseline-zero difficult because of orthopneic position

diastolic filling but with good contraction of both ventricles. The extra-cardiac shadow extended for some distance beyond the opacified cardiac chambers, suggesting the presence of extraneous pericardial material.

Pericardiectomy was undertaken with some urgency after completion of investigation. At operation the heart was found to be almost immobile and contained within a thickened pericardium; the movement of the cardiac chambers was greatly improved by removal of adherent, caseous material, pathological examination of which showed fibroid and tubercloid granulomata.

The post-operative course was stormy, with early severe dyspnoea and cardiac failure, and later bilateral pyelonephritis and mild pneumonia. Foetal movements and heart sounds were present and normal throughout the post-operative period. Treatment of heart failure and tuberculosis was continued, and over a two-month period the patient improved. Pulsus paradoxus and venous distension disappeared. She was transferred to the obstetrical department and 18 weeks after operation was delivered by forceps of a healthy male child weighing 4 lb. (1.8 kg.) without recognized congenital deformities.

#### DISCUSSION

Constrictive pericarditis in pregnancy is a rare lesion and indications for surgical management have not been established. In order to rationalize management it is necessary to evaluate the results of medical and surgical treatment of other cardiac diseases in pregnancy and to examine the criteria for pericardiectomy in non-pregnant patients.

**MATERNAL RISKS** The maternal mortality in pregnant patients with cardiac disease treated medically ranges from less than 1% for patients in functional classes I and II to between 4 and 18% in patients in classes III and IV (Ueland, 1965; New York Heart Association, 1964). Closed mitral valvulotomy in pregnancy carries an operative mortality of 2 to 3% (Ueland, 1965; Schenker and Polishuk, 1968). The surgical results are similar to those recorded in non-pregnant patients and indicate that an operation for mitral stenosis during pregnancy would benefit moderately or severely disabled patients (Lowther and Turner, 1963). This is in agreement with our own experience; we routinely undertake closed mitral valvulotomy in pregnant women in whom mitral stenosis produces symptoms.

Other cardiac lesions, such as persistence of the ductus arteriosus or aortic coarctation, which do not require the use of extracorporeal circulation in their surgical management, have also been successfully corrected during pregnancy (Szekely and Snaith, 1963; Cannell and Vernon, 1963). Series are small and insufficient experience has accumulated to permit assessment of the risks involved to both mother and foetus.

Operations with cardiopulmonary bypass are being performed in pregnancy, and, although the number of cases reported is small, it appears that pregnancy itself does not increase the maternal risks of this type of surgery. The foetal mortality of 33% is, however, much higher than the comparable mortality of 2% reported in patients who undergo closed mitral valvulotomy (Ueland, 1965).

**FOETAL RISKS** In respect of tuberculous pericarditis in pregnancy, the risk to the foetus can be related to the activity of tuberculosis in the mother, the degree of pericardial constriction, an operation for relief of constriction, and treatment of both tuberculosis and cardiac failure. Lowe (1964) studied the stillbirth rate, infant mortality rate, and incidence of congenital defects in women with pulmonary tuberculosis, only 31% of whom received drug treatment during the first four months of pregnancy. The stillbirth and infant mortality rates were both below the reported levels for the total population; 3% of infants whose mothers were treated in the first four months had congenital defects; 4% of infants whose mothers were not treated had congenital defects. Comparable figures for infants of non-tuberculous mothers in the same population were not given, but figures for 1954-66 in England and Wales show a congenital defect rate of 0.2% (Slater, Watson, and McDonald, 1964).

Foetal mortality is increased in women with cardiac disease, and an increase of up to 50% has been reported in patients with grades III and IV disability (Hamilton, 1947). In contrast, the foetal mortality rate is 6 to 9% among pregnant mothers in whom a mitral valvulotomy has been performed (Wade, Nicholson, and Jones, 1958).

Congenital defects have occurred after cardiac surgery, but mostly in those patients who required extracorporeal circulation. In these circumstances defects have been related either to the primary condition (cyanotic congenital heart disease) (Barnes, 1963) or to poor placental perfusion associated with intravascular sludging and stasis (Ueland, 1965).

In general, drug therapy in pregnancy increases the danger of foetal malformations, but digitalis appears to be safe (Editorial, 1967) and the diuretics are not known to be potentially dangerous (Lenz, 1966); anti-tuberculosis drugs (streptomycin, para-aminosalicylic acid, and isoniazid) do not harm the foetus, and treatment of maternal tuberculosis decreases foetal mortality (Marcus, 1967); medical treatment administered before or after an operation probably does not add to the risk of pregnancy.

**INDICATIONS FOR PERICARDIECTOMY** Constrictive pericarditis imposes a mechanical restriction on the diastolic excursion of the heart. Significant cardiac constriction, as assessed from the patient's symptoms and on haemodynamic criteria, is an indication for pericardiectomy, an operation which should be delayed if the clinical state of

the patient can be improved by medical treatment and to permit anti-tuberculosis chemotherapy to confine the activity of the tuberculous infection. The majority of patients already in the constrictive phase, who are not treated surgically, deteriorate as the result of ingravescent constriction until they eventually develop a low cardiac output and severe pulmonary and systemic venous congestion. In contrast, the results of surgery are rewarding. The recorded operative mortality is about 4% (Portal, Besterman, Chambers, Sellors, and Somerville, 1966); in the last four years 64 patients with tuberculous constrictive pericarditis have undergone pericardiectomy in this Unit with a mortality of 5%. The long-term results have been excellent. While initial progress may be slow, the majority of patients are asymptomatic by the end of one year if anti-tuberculosis therapy is continued.

The risks of pericardiectomy during pregnancy, in common with closed heart surgery, appear therefore to be small. In this patient surgical management was undertaken because of the gross pulsus paradoxus, the severity of constriction and the degree of disability. The post-operative course was complicated, but recovery was complete, pregnancy was uninterrupted until delivery of a normal full-term infant, and the patient does not now have signs of residual constriction.

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