

A NOTE ON THE HEART IN PREGNANCY AND LABOUR.*

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THE subject of this paper is of interest to the physician quite as much as to the obstetrician. To the latter, it is true, is likely to fall the responsibility of dealing with obstetric emergencies whose gravity may be multiplied by the co-existence of cardiac disease. To the physician, on the other hand, will fall not only the care of the prospective mother suffering from heart disease, but the responsibility of advising on the difficult points as to whether marriage or pregnancy should at all be permitted.

Before approaching the subject of the diseased heart, it is necessary to ask whether pregnancy in itself makes any physiological difference to the healthy heart. One can hardly doubt that the term "strain of pregnancy" has a real meaning, that the burden of supplying a rapidly increasing tumour with copious blood-supply at the same time as the adjustments of the internal organs are undergoing some disturbance must increase the work of the cardiac muscle. Even the healthiest of females—women or other animals—becomes more quiescent during pregnancy and feels fatigue more quickly than at other times. How much of this disturbance is due to extra work thrown on the heart, and how much to interference with the position of the viscera by the enlarging uterus one cannot tell.

Dyspnœa on slight exertion, for instance, may be due in part to the heart's reaction to exercise being more limited in range, and in part to the activity of the diaphragm being hampered.

There is no doubt that in many cases the heart is displaced as a result of the increase in size of the uterus. The heart is swung upward and outward. This has been shown by *x*-rays. According to Blacker (*a*) such displacement takes place to a greater extent in short, squat women than in tall women. It would be interesting to know whether the latter

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suffer less of the minor inconveniences of pregnancy—dyspnœa and fatigue, for example—than other women.

It has been very generally held that the normal heart undergoes a certain amount of hypertrophy during pregnancy. On *a priori* grounds one might expect such hypertrophy to take place, but it is difficult to establish it as a fact. Clinical observation may be misled by the displacement of the apex beat, of which I have just spoken, while conclusions based on changes in murmurs or on the appearance of murmurs are not trustworthy, as many other causes besides hypertrophy may be at work. On the other hand, the results of autopsies are not convincing, since in the cases that come to autopsy other causes have been at work which may have caused change in the walls of the heart. An experimental study has recently been made by Herring (*b*) of the effect of pregnancy in rats upon the size and weight of some of the organs of the body. He found that the weight of the heart, kidneys, and spleen were little altered by the occurrence of pregnancy. On the average the heart of the pregnant animal weighed 4.7 per cent. less than that of the controls. On the other hand, there was a decisive increase in the weight of the liver (27.5 per cent.) and some hypertrophy of the adrenals (12 per cent.).

Mackenzie (*c*) stated some years ago that his own observations did not lead him to conclude in favour of hypertrophy, although the evidence of others had convinced him. On the whole, one must conclude that hypertrophy, if it occurs, is so slight as to be negligible.

As Mackenzie says, it is not compensatory, in the sense of making a pregnant woman to be as active as before conception.

On the other hand, are there any signs of disordered function of the heart which can be regarded as normal on account of their frequency in pregnant women? Mackenzie says, in reply to this:—“ I found a series of changes arise which, though in one sense abnormal, might in another sense be considered as incidental to the pregnant state. These conditions were:—

- (a) Limitation of the field of cardiac response
- (b) Changes in rate and rhythm of the heart.

- (c) Dilatation of the right side of the heart.
- (d) Tendency to œdema of the lungs.
- (e) Tendency to overfilling of the veins of the legs.
- (f) The occurrence of marked pulsation in the veins of the neck."

He notes too that the first of these, the limitation of the field of cardiac response, begins in the very early months of pregnancy, long before the bulk of the uterus calls for any increased action of the heart. The dilatation of the right side of the heart is shown both by the extension of cardiac dulness towards the right and by the frequent occurrence of some degree of pulmonary œdema. This is fairly common in the late months of pregnancy, its most frequent physical sign being fine crepitations at the base of the lung. It is Mackenzie's opinion, therefore, and the facts on which he bases it are open to us all, that pregnancy frequently puts such a strain on an undiseased heart as to produce signs and symptoms of definite disturbance of function.

How important such disturbance may be when we have to deal with a diseased heart we have next to consider. For many years, following Angus MacDonald (*d*), who in 1877 published a monograph on the relations of heart disease and pregnancy, the gloomiest views were held of the prognosis in cases of association of these conditions. Of the cases of heart disease in pregnant women that came under MacDonald's notice no less than 60.7 per cent. died as the result of pregnancy or labour. With such a figure unquestioned for years, it is little wonder that physicians and obstetricians gave very decided advice to such women suffering from heart disease as consulted them against undergoing the risks of pregnancy and marriage. But many women undertook these risks against advice, and while some no doubt suffered in consequence, others did not. Again, a great many more women did not seek advice, happily ignorant of the risks of their cardiac condition, and comparatively few of them suffered. In the light of later observations, one must conclude that in MacDonald's observations only cases of severe heart disease were noticed, and in all probability many cases of heart disease without obvious or compelling symptoms had escaped notice. At a later date

Fellner (*c*) showed that in Schauta's clinic, six out of every seven cases of heart disease had been unnoticed, and nevertheless the mortality was only 3 per cent. He established a more rigorous scrutiny of patients in the clinic for the discovery of heart disease, with the result that among the first 900 cases recognised as heart disease there was only 1 death. The mortality, therefore, among cardiac cases in Vienna would appear to be about half the normal mortality in the Rotunda. One can hardly, therefore, regard Fellner's observations as exact. He must have classed as suffering from heart disease many patients who had no organic disease of the heart. If every pregnant woman who presents a murmur is to be regarded as suffering from organic disease, one will arrive at strange results. Nevertheless, Fellner's observations furnish a useful corrective to the pessimism engendered by MacDonald. In truth it is impossible from statistical data to arrive at any accurate conclusions as to the prognosis when heart disease is complicated by pregnancy, unless one could have first the assurance that every observer had the same views as to what constitutes organic valvular disease. To show how various are the conclusions arrived at in different clinics, let me quote (after Hirschfelder (*f*)) the percentage mortality as published by eleven observers:—Lublinsky 60, v. Leyden 55, Wessner 49.3, Schlayer 48, v. Guerard 34, Jess 31.5, Wiesenthal 12.5, Lwoff 12, Schneider 7.1, Gusserow 6, Müller 3, and, as already stated, Fellner 0.1. Even if there were a general agreement, prognosis based on statistics is very little use, unless corrected radically by consideration of a particular case.

We may, however, look at the mortality from heart disease in pregnancy (with labour) from another point of view, by asking whether among the deaths occurring in connection with child-bearing heart disease is frequently found. I have gone over the mortality tables of the Rotunda Hospital for the eleven years 1905-1915. In these tables notes are given of every individual patient who died. I find that 46,204 women were delivered, with 168 deaths. In 11 of these deaths the heart was concerned. In 7 of these (those occurring in the intern department)

the diagnosis was confirmed or established by autopsy. The causes of death in these 7 cases were:—

(1) hemiplegia occurring in course of acute rheumatism and acute endocarditis, (2) uræmia in a patient with chronic endocarditis and nephritis, (3) acute dilatation of heart without any valvular lesions, (4) fatty degeneration of heart muscle, (5) do., (6) mitral stenosis, (7) fatty degeneration. In the four extern deaths the causes, judged on clinical grounds, were:—(1) mitral stenosis, (2) chronic endocarditis with acute dilatation, (3) chronic endocarditis and chronic nephritis, (4) chronic endocarditis. It will be noticed that heart conditions concerned only 6.54 per cent. of all the deaths in the practice of the hospital, and that death associated with heart disease occurred in only 1 of every 4,200 women delivered.

We have it is true no means of following the after-history of patients when they have left the hospital, and it is possible that a certain proportion of patients were broken down by the strain of pregnancy and labour and that some of them died subsequently as the result thereof.

The hospital records do not give any information of the cardiac condition of the general run of patients treated or admitted, and therefore one cannot form any view of the case mortality.

One cannot but believe, however, that out of 46,204 women there must have been a very large number of cases of heart disease, and that only eleven fatalities occurred in the practice of the hospital is proof that the great majority of patients with heart disease passed with safety through the risks attendant on child-bearing.

Dr. N. M. Falkiner has been so kind as to inform me that of the total number of deaths registered as associated with pregnancy and child-bearing in Ireland 1.7% in the years 1901-10 and 1.3 in 1919 were assigned to heart disease; in England and Wales 4.42 were so assigned in 1919.

So much as regards the general outlook in regard to the occurrence of pregnancy in patients suffering from organic heart disease. The real problem for each of us is, however, whether a particular patient is likely to stand the strain with safety. Here we have to consider two points—the

nature of the organic lesion, and the condition of the heart to meet demands made on it. It is the great merit of Mackenzie's teaching that he has emphasised in regard to heart disease in general the greater importance of the second consideration, a point, by the way, which I think was never entirely overlooked in Dublin teaching.

As regards the nature of the valvular lesion there is general agreement that mitral stenosis is the most serious for a woman undertaking the responsibility of pregnancy. The tendency to dilatation of the right side of the heart, with the unpleasant accompaniment of pulmonary œdema is greatest in case of this lesion. There is the added danger of cerebral emboli, to which accident was due one of the Rotunda deaths. Next in order of gravity is aortic regurgitation, which, however, is rare in women of child-bearing age, and then mitral regurgitation.

More important, however, than a localisation of the lesion is the judgment of the heart's function. I have quoted Mackenzie's observations to show that minor disturbances of cardiac function cannot be regarded as abnormal in pregnancy. Of grave signs, cyanosis on slight exertion is one of the most important. Graver still are the ordinary signs of failing compensation—increasing dyspnœa, cyanosis, enlarged liver, general œdema.

Blacker, indeed, questions whether pregnancy hastens failing compensation, and it is true that sudden failure rarely occurs during actual labour. It is obvious that the earlier in pregnancy compensation fails the more serious the condition. The question arises whether in view of progressively failing compensation labour should be terminated. On this point there is great difference of opinion. One should certainly, in the first instance, use every means to restore compensation other than terminating the pregnancy; but if, in spite of treatment, function steadily gets worse, one has no choice. One must, however, remember that the induction of premature labour itself imposes a considerable strain on the system.

In the case of a woman seeking advice as to the wisdom of undertaking the risks of pregnancy there is now a fairly general agreement of opinion. If she has and has had good

compensation she may fairly face the risks. If she has failure of compensation or has had frequent attacks of failure of compensation, pregnancy should be forbidden. Moreover, if in a previous pregnancy there has been any serious breakdown, future conception should not be permitted. Mackenzie defines these rules so clearly that I may close this note with a quotation from him:—

“ 1. When there is a distinct evidence of failure of compensation, or when the patient is liable to frequent attacks of failure of compensation, pregnancy should be forbidden.

“ 2. With fair compensation, if there should be paralysis of the auricle, as evidenced by the presence of a diastolic murmur and the absence of a presystolic murmur, or of a continued irregularity of the pulse, or of a jugular pulse of the ventricular type, pregnancy should be forbidden.

“ 3. With fair compensation, with a mitral murmur systolic or presystolic in time, with the apex beat within the nipple line, and close to the left ventricle, the patient may undertake the burden of pregnancy.”

The answer to the question of the permissibility of marriage and pregnancy will, therefore, depend on a careful estimation of the condition of the heart, not so much as regards its valves as its function. If a heart is performing its function without interruption over a term of years it will in all probability meet the strain of pregnancy with success and safety. If it has failed, it is likely to fail again.

REFERENCES.

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