

GLYCOSURIA IN PREGNANCY

by

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Most text books, still continue the teaching that the reducing substance appearing in the urine of a pregnant woman is glucose; lactose making its appearance only after delivery. However, workers who have investigated this problem have come to a different conclusion. The following investigations were undertaken to see if we could corroborate their findings.

Material and method—Urine specimens were collected from 325 unselected ante-natal cases, in all trimesters of pregnancy and were tested for reducing substance by Benedict's test done in the standard manner.

In those patients in whom Benedict's test was positive, history was taken, especially, as regards diabetes, family history of diabetes, previous obstetric history, history of large babies and obesity, if any, was noted.

Incidence—Flynn *et al* found 72.9% of Benedict's reductions during pregnancy. Pai and Patel investigating cases of abortion found Benedict's reductions in 51% of their cases. Theirs was, however, a selected series. In our own series, out of 325

cases, we found 80 or 24% showing reduction with Benedict's test. Flynn *et al* attribute their larger figures to differences in technique.

To detect diabetes amongst our patients, they were further subjected to glucose tolerance tests. There were 3 cases of diabetes, of which 2 were already under treatment. There was only 1 case with a history of a large baby, but her glucose tolerance curve was normal. No patient gave family history of diabetes, but that was probably due to ignorance and lack of medical care. Obesity was not particularly striking in any of the patients. Amongst the normal cases, the lowest level of fasting blood sugar was 72 mgm. and highest was 104 mgm. while the two hours reading in glucose tolerance test showed the lowest to be 83 mgm and highest 114 mgm.

There were 5 cases showing abnormal curves. In these cases there was a delay in the fall of blood sugar level, although their fasting and 1 hour values were within normal limits. These are the patients who require a careful follow-up, for an abnormal glucose tolerance test represents diabetes in its earliest stages.

Fajans and Conn (1959) regard the combination of 1 hour blood sugar value of 160 mgm or above, plus a 2 hour value of 120 mgm or above

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as diagnostic of the existence of the diabetic state. Wilkerson (1959) estimated that 6.2% of patients seen would have abnormal carbohydrate metabolism during pregnancy. These figures agree with those of Lund and Weese (1953) who found that 8% of pregnant women had abnormal tolerance curve.

Age and parity—Most of our patients were in the younger age group. Fifty-one were between 18-25 years, only 3 were 31 years and over. As regards parity, over half were between I and II paras, and only 15 were V para onwards. We were unable to find any correlation between age, parity and presence of glucose in urine, although Flynn *et al* found antenatal glycosuria more frequently in older patients and lactosuria increasing in incidence with advancing pregnancy and in primiparae.

Osazone test—To find out whether the reducing substance was glucose or lactose, osazone test by charcoal absorption method, according to Cole, was done. Flynn *et al* using paper partition chromatography, which enables reducing substances to be identified with certainty even when present in low concentration, found lactose in 51% of all ante-natal attendances and glucose in 24%. Flynn *et al* noted that the amount of lactose excreted is usually less than 100 mgm/100 cc, while the quantity of glucose excreted during pregnancy is usually less than 67 mgm/100 cc. Pai and Patel found reduction due to lactose in about 88% of the total reductions. Lactosuria, which was distinguished by Barfoed's test and

confirmed by osazone test, occurred in 44% of their cases and glycosuria in 16% of cases only. Lactosuria was detected in 83% and glycosuria in 16.6% of our total reduction cases. Our osazone tests were probably not sensitive enough to detect low concentration of glucose. Probably quite a large number of pregnant women excrete both glucose and lactose and occasionally fructose and pentose. Lactose probably being in higher concentration is detected in larger number of cases.

Flynn *et al* found glucuronate extremely often, with or without the above sugars. More sensitive methods are required to get the correct incidence. Flynn *et al* found the incidence of lactosuria twice as often as glycosuria.

Discussion—The recorded results show that lactosuria is more common in pregnancy than glycosuria. Glycosuria in pregnancy can be partly explained by a lowering of the renal threshold for glucose due to diminished capacity of the proximal convoluted tubules to reabsorption of sugar, brought about by defect in the phosphorylating mechanism of the tubular cells. A diminished tolerance for sugar may be considered an additional factor in production of glycosuria in pregnant women. The exact mechanism of lactosuria during pregnancy is not known. Flynn *et al* believe that lactosuria may result, either from synthesis of lactose in the mammary glands or from absorption of lactose from the intestines without prior splitting into glucose or galactose. Flynn *et al* explain the less frequent lactosuria in multiparae on the

basis that their breasts, having previously undergone complete development more readily accommodate the small volume of secretions, without pressure rising within the alveoli, leading to reabsorption of lactose.

Watkins (1928) postulated that lactosuria during lactation resulted from milk production exceeding milk removal. Of great importance is the possible relationship of renal glycosuria to the future development of diabetes mellitus. Pre-diabetes is now a well recognised condition and a urine showing Benedict's reduction should not be brushed aside as a benign condition of renal glycosuria.

Lund and Weese (1953) confirmed the importance of the triad of excessive foetal size, abnormal glucose tolerance curve and maternal obesity. Wilkerson's (1959) programme for screening all patients by means of a 2 hour blood sugar test may prove a practical proposition.

Summary

Three hundred and twenty-five consecutive new ante-natal cases were investigated to find out the incidence of glycosuria in pregnancy. Twenty-four per cent showed Benedict's reduction. They were further subjected to glucose tolerance tests. There were 3 cases of diabetes. In 83% of the cases the reduction was due to lactose, while in 16.6% it was

due to glucose—confirmed by osazone tests. Glycosuria during pregnancy is probably due to low renal threshold, while lactosuria probably occurs as a result of escape of lactose formed in the mammary glands.

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