# The Antenatal Detection of Asymptomatic Disease

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### SUMMARY

A prospective study was introduced to establish the role of the antenatal clinic as an 'early detection unit' for the screening of asymptomatic disease not specifically related to pregnancy.

Patients were screened for diabetes, iron deficiency, carcinoma of the cervix, asymptomatic urinary tract infection, and vaginal disease. Four racial groups, Black, Coloured, Indian, and White, were studied.

In terms of time, cost and practicability, it was found that antenatal visits could be used for screening purposes.

Screening for conditions known to be prevalent among certain racial groups increases the rate of detection.

Screening for asymptomatic disease during pregnancy, can be introduced easily into private practice with a minimal involvement of cost and time for both patient and doctor.

The long-term benefit of the early detection and treatment of disease is discussed.

One objective of good medical practice is the prevention and the early detection, if possible, of disease.

This objective is admirably illustrated by modern obstetric practice. Ballantyne[1] in 1901 introduced the concept of a 'pre-maternity hospital', the forerunner of modern antenatal care, and so firmly established a branch of therapeutic and preventive medicine. The benefits are well known: maternal mortality which at the turn of the century was as high as 4,8/1 000,[2] has been reduced to 0,20/1 000,[3] the same benefits have accrued to the foetus. Calculation of the perinatal mortality rate, first introduced in 1930, has shown a gratifying fall from 63/1 000 to 25/1 000 in 1967.[2] Although modern advances in blood transfusion, anaesthesia, chemotherapy, etc. have all contributed to the safety of pregnancy and childbirth, antenatal care *per se* has contributed a large, if not the major share.

The benefit of antenatal supervision is now accepted as much by the lay public as it is by the medical profession. The obstetrician has an ideal situation for furthering the principles of preventive medicine, i.e. to screen his 'captive population' of pregnant women for asymptomatic disease not necessarily related to pregnancy.

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Research into the feasibility and practicability of such a programme has been under investigation at Addington Hospital during the past 3 years. The study has been conducted in stages and has attempted to answer three questions: What conditions can be easily screened for during pregnancy? What is their incidence? And what is the best method of detecting them?

An equally important question is: What is the value to the patient of an 'early detection programme'? The answer to this, however, rests with the long-term follow-up of both 'suspects' and 'controls', but as this is at present beyond the scope and the facilities of our unit, comment on the question will be based on the experience of others.

## PATIENTS AND METHODS

Patients attending the Obstetric Unit of Addington and the King Edward VIII Hospitals, Durban, were included in the 'early detection programme', at random. They were usually screened on their first attendance at the antenatal clinic. The main requirement was that they should be asymptomatic. By pooling the resources of these two units, 4 different racial groups became involved in the investigation: White, Coloured, Indian and Black.

The 5 conditions that form the basis of this study, apart from their medical significance, also have some specific relevance to obstetric or gynaecological, or both practices; they are: diabetes mellitus; anaemia, and in particular, latent iron deficiency; urinary tract infection; asymptomatic vaginal disease; and carcinoma of the cervix uteri.

## DIABETES MELLITUS

### Need for Early Detection

The early detection of diabetes is of value only if it leads to improvement in the health of the patient.

There is much evidence to suggest that in the non-pregnant woman, even minor elevations of blood sugar could be associated with a tendency to arterial disease.[4] Furthermore, diabetes, even when asymptomatic, is rapidly becoming the commonest single cause for defective vision;[5] it is responsible for chronic renal disease and peripheral neuritis,[6] and it contributes significantly to the pathogenesis and morbidity of cardiovascular disease.[7]

A recent follow-up of women screened in the original Birmingham survey has shown that minor abnormalities of

glucose tolerance are also important, since no fewer than 20% of such patients, when they were retested 5 years later, had 'florid' diabetes.[*] The crucial issue, however, is whether early treatment of these patients results in long-term improvement in the diabetic state, and whether careful treatment by modern methods will delay, if not prevent, diabetic angiopathy, the 'maimer' and 'killer' of diabetic patients. At present, opinions are divided.[9,10]

There is convincing evidence that during pregnancy a high perinatal mortality rate, approaching 50% of all births in some series, commonly occurs during the pre-diabetic and therefore, the asymptomatic phase of diabetes mellitus.[11] This finding has been confirmed recently by both Jackson[12] and the author.[13] In the latter series the previous perinatal loss of patients with 'recently diagnosed' and 'established' diabetes, was significantly greater than in a control group of non-diabetic patients. Although there may be some doubt as to the long-term benefit of the early detection of diabetes in non-pregnant subjects, the treatment of pregnant patients with latent and 'chemical' diabetes, certainly results in a definite improvement in foetal survival.[14]

The need for, and the value of, a screening programme also depend in large measure upon the prevalence of the disease in a particular community. For example, in South Africa, diabetes in the Indian has been found to involve some 21% of individuals over the age of 35 years.[15] Moreover, it is known that they are highly susceptible to the cardiovascular complications of diabetes.[16] The early detection and treatment of carbohydrate intolerance would obviously be of benefit to the pregnant Indian woman; the benefits relating to angiopathic involvement are, as mentioned previously, less clear.

However, by screening patients into 3 groups: normal, suspect and abnormal, the suspect group can be kept under surveillance and by so doing ensure that when (and if) diabetes should manifest itself, early treatment will be possible. Just how much a patient in this category is told, will depend upon the individual concerned, for unnecessary distress caused by worry can be more detrimental to the patient than the suspected disease itself. Judicious explanation, and discreet advice regarding the patient's diet, for example, can be only beneficial. Patients whose 'chemical' state of diabetes has been brought to light should be treated.

## Methods of Diabetic Screening

Pregnancy is an ideal time to screen for diabetes since it provides a potent diabetogenic stress that may reveal a diabetic diathesis. The results of recent population[17,18] and other surveys[13,19] indicate that screening for diabetes by enzyme-tested urinalysis is a wasteful procedure. This is particularly true during pregnancy and is due to a decreased tubular reabsorption of glucose, and an increased glomerular filtration rate. It has been established that between 16,2% and 90% of pregnant women have evidence of sugar in the urine.[19] To reduce the incidence of false positives, Sutherland et al.[20] recently showed that the

testing of a second fasting specimen of morning urine is more reliable for screening purposes.

The method of choice for the screening of diabetes is still the measurement of blood sugar after a glucose load.[17-19] In a study undertaken at the King Edward VIII Hospital[13] it was noted that no fewer than 35% of established diabetics presented with aglycosuria and that only 18,4% of pregnant women with glycosuria were diabetic; thus the need for screening by blood sugar measurement was confirmed. To evaluate whether Dextrostix would fulfil the requirements of a diabetes screening programme, over 1 000 patients attending the Antenatal Clinic were screened with this medium.[21] The results were compared with those of an auto-analyser and they showed that (a) blood sugar estimations of specimens taken 2 hours after a 100 g glucose load were much more reliable than urinalysis, and (b) they could be accurately assessed for screening purposes by Dextrostix. Of the 431 Indian patients screened during this survey, 5,6% were found to have a carbohydrate intolerance; in the 605 Black women screened the figure was 1,3%. Glycosuria in the presence of normoglycaemia was noted in 12,2% of the Blacks and in 11,2% of the Indians. By using Dextrostix it was possible to divide the survey group into the categories mentioned. Because the diabetogenic effect of pregnancy is progressive patients should be screened in each trimester.

# ANAEMIA AND LATENT IRON DEFICIENCY

## Anaemia and Pregnancy

Anaemia is the commonest medical complication of pregnancy and it is generally agreed that iron deficiency is the principal cause.[22] The incidence of anaemia in pregnancy varies, however, since normal values are often based on different haematological values. Even if they are agreed on, they tend to vary between the different socio-economic groups, races, and populations in different countries. For example, in a recent local survey[23] the mean haemoglobin values in unselected and equally matched 'normal' women during the third trimester of pregnancy were 10,8, 12,2 and 11,9 g/100 ml for Indian, Blacks and Whites respectively. At face value, these differences could be regarded as being due to racial factors. A consideration of the mean transferrin saturation, as an index of iron stores, revealed a marked iron deficiency in the Indian patients (transferrin saturation 9,2%) compared with the other 2 groups, 20,0% for Blacks and 18,5% for Whites. This illustrates that differences in haemoglobin values are more closely related to variations in dietary haematinics, than to some vague racial factor.

Another fallacy is the so-called 'physiological hydraemia of pregnancy'. More recently it was shown that if the bone marrow is supplied with adequate amounts of iron, folic acid, and other essential haematinics, the red cell and haemoglobin mass will increase in proportion, and haemodilution will not occur.[2,24] A group of untreated pregnant Black women studied recently maintained normal

haemoglobin values throughout pregnancy despite the fact that they, too, must have been subjected to the same 'physiological' haemodynamic changes. Evaluation of their iron status showed that whereas pregnancy does affect iron saturation in Black women, the majority can mobilise iron from their stores to meet their erythropoietic need. Those with inadequate iron stores and unable to meet their needs, had to have iron therapy.[25]

Because haemoglobin synthesis takes priority, iron deficiency without anaemia occurs fairly commonly in man.[26,27] Since latent iron deficiency may be of importance during pregnancy[22] a study was undertaken to see how closely the haemoglobin and other haematological values (serum iron; transferrin saturation; MCHC; PCV and examination of a peripheral blood smear), would reflect a deficiency of iron stores in a random group of antenatal patients seen at their first attendance.[28] As it was unpractical to assess iron stores by estimating the amount of haemosiderin in bone marrow, a transferrin saturation of less than 26% was chosen as the dividing line between normality and abnormality. This is said to be the best haematological indicator of sideropenia.[29]

From this study, it was noted that if a haemoglobin of 11 g/100 ml is regarded as normal, 11% of the White and 21% of the Coloured patients would have been classified as anaemic. When the state of their iron metabolism is considered, however, 57% of White and 72% of the Coloured would have had values less than normal. No fewer than 13% of the Whites and 32% of the Coloured patients had transferrin saturation indices suggesting deficient iron stores (transferrin saturation less than 16%).

Viewed differently, 12% of the patients with haemoglobin above 12 g/100 ml had evidence of iron deficiency (transferrin saturation less than 16%), the transferrin saturation being less than 26% in 61,4% of them. The lower the haemoglobin, the greater the incidence of iron deficiency. In the group with haemoglobin values between 10 and 12 g/100 ml, 40,3% had transferrin saturation values of less than 16%. Only 8 patients in the series had haemoglobin less than 10 g/100 ml. Of these, 6 had deficient iron stores.

Of the other haematological factors, only serum iron levels below 100 mg/100 ml approximated fairly closely to a transferrin saturation of less than 26%. Castren and Levanto[30] also noted that the iron stores could be better assessed on the basis of serum iron than of haemoglobin. Mayat,[22] utilising the same laboratory and standards, noted a progressive fall in the serum iron of pregnant Indian patients (in whom iron deficiency is widespread), while in Blacks (who usually have adequate body iron stores) the serum iron remained more or less constant throughout pregnancy. It is, therefore, prudent to regard diminishing serum iron levels during pregnancy as indicative of iron deficiency rather than haemodilution. We were able to conclude that: (a) anaemia is common and the incidence varies in the socio-economic, rather than racial, groups; (b) iron deficiency during pregnancy is very common and frequently independent of the haemoglobin; (c) the most accurate single haematological index of iron deficiency is a serum iron value of less than 100 mg/100 ml.

## Significance of Iron Deficiency

With regard to the rather inconsistent relationship between haemoglobin level and iron deficiency, what, in practical terms, is the significance of iron deficiency in pregnancy? Basically, iron serves two main functions: firstly, it stimulates the synthesis of haemoglobin for oxygen transportation, and secondly it provides for the physical well-being of the patient, not only during labour and the puerperium, but particularly in later life. Therefore, if we regard values above 11 g/100 ml as satisfactory for oxygen transportation, then 89% of our White patients without prior supplementary treatment would have satisfactorily met the immediate needs of pregnancy. The same would be true for 79% of the Coloured women. If, however, body iron stores are important for the well-being of the patient, one-half of the White and three-quarters of the Coloured patients would have had compromised iron stores, and markedly low levels would have been reached in some 10 - 30% of them.

Obstetrically it has been shown[2] that patients with severe anaemia (haemoglobin less than 60%) have a perinatal mortality double that of patients with haemoglobins of 70% or more. Furthermore, anaemic women are more prone to the hazards of antepartum and post-partum haemorrhage and infection, deep venous thrombosis in the puerperium, and poor lactation.[2]

Many remain unconvinced of the clinical benefits likely to accrue to the health of the general population if, for example, the iron intake of all sections was increased by the enrichment of staple foodstuffs with an iron salt.[31] Until proved otherwise, it is my opinion that the female population, especially in the reproductive phase of life, should be iron-replete.

## Screening for Latent Iron Deficiency

A consideration of the demands of pregnancy and lactation, the amount of iron present in the average diet, and that given prophylactically during pregnancy (if taken at all), makes it obvious that most of the patients served by our unit would not be able to make good this deficiency, and would end their pregnancy with a marked iron deficiency. The situation is worsened by repeated pregnancies and menstrual irregularities.

It is essential to establish the precise iron state of every patient as early as possible in pregnancy. This can be achieved only by screening them at their initial visit, not only by determining haemoglobin concentrations, but also by an estimation of their iron stores. Unfortunately there is no readily available simple method to achieve this.

At present all patients are screened by measuring the haemoglobin; if the value is low there is a strong possibility that she is iron-deficient. Another sample of blood should be taken for the assessment of the serum iron and iron-binding capacity before the patient leaves the clinic, and she should be instructed to come back for the result. By this method treatment can be started early in pregnancy. Usually patients are seen again 1 month after the first attendance.

## Megaloblastic Anaemia

A less frequent, but equally important, cause of anaemia is folic acid deficiency. This is often precipitated by pregnancy because of the avidity of pregnant patients for folic acid, particularly with cases of multiple pregnancy.

Folic acid deficiency has been linked with specific complications during pregnancy and in particular with an increased abortion and accidental haemorrhage rate.[33] Besides other adverse systemic effects, there is therefore a need to detect a deficiency of folic acid.

Unfortunately the diagnosis is not simple. Apart from bone marrow biopsy (which obviously cannot be done as a routine) the diagnosis in obstetric practice is time-consuming, e.g. looking for hypersegmentation in poly-morphs on a blood film; of questionable accuracy, e.g. the FIGLU excretion test;[34] or difficult and costly to perform, e.g. serum and red cell folate levels. Evidence of folic acid deficiency is sometimes picked up coincidentally on the Papanicolaou smear.

It is our policy to look for folic acid deficiency in cases of 'severe' anaemia, especially in patients with haemoglobin levels below 60%. All other patients receive daily prophylactic supplements of folic acid as a routine.

# URINARY TRACT INFECTION

## Obstetric Significance of Urinary Tract Infection

Most patients who die from renal disease die as a result of chronic pyelonephritis; most patients who develop chronic pyelonephritis have had repeated attacks of urinary tract infection which have been neglected, under-treated, non-responsive to therapy, or missed. The latter often occurs because many patients are asymptomatic.

A recent review of the literature[35] indicates that pyelonephritis in pregnancy is definitely associated with an increase in premature births, stillbirths, and neonatal deaths. Fewer complications occur with early and adequate treatment.

Controversy over the significance of asymptomatic bacteriuria continues. A vast amount of literature has accumulated since Kass[36] first drew attention to the association of asymptomatic bacteriuria and pregnancy. Some of the points which emerge are:

(i) The pregnant patient with ASB is more likely to develope acute pyelonephritis in late pregnancy than is the normal woman. Estimates of this complication vary from 14% to 63%.[37]

(ii) The incidence of acute pyelonephritis can be reduced by early treatment of asymptomatic bacteriuria.

(iii) Women who have asymptomatic bacteriuria, and particularly those who fail to respond to treatment, have a high incidence of serious abnormalities in the urinary tract.

(iv) The bacteriuric patient is more likely to give birth to an infant of low birth mass.

(v) Some workers have reported an increased foetal wastage among women with bacteriuria due to factors other than prematurity. Consensus on this point is lacking. The fact that the incidence of bacteriuria is higher, the lower the social class,[38] may be the explanation for this foetal loss.

From the above it would appear that the screening of pregnant women for asymptomatic bacteriuria should be a routine antenatal procedure, not only to reduce obstetric complications, but to detect those women who may have serious and, possibly, correctable lesions of the urinary tract.

## Screening for Asymptomatic Bacteriuria

The counting of bacteria in urine is now established as the most accurate way of distinguishing true infection of the urinary tract from contamination. When 100 000 or more organisms per millilitre of urine are present, bacteria are multiplying in the bladder, and true infection may be said to be present. On the other hand, in carefully collected midstream urine specimens contaminating organisms do not exceed 10 000/ml and there are usually fewer than 1 000/ml.

In a screening programme, apart from the difficulty of collecting suitable specimens for analysis, the bacterio-logical assessment of the urine is a formidable problem. The full laboratory examination of urine specimens from all patients attending an outpatient clinic is time-consuming and places a great strain upon the average laboratory, especially if quantitative procedures are done.

A study was recently initiated at Addington Hospital to try to establish a reliable, rapid, and simple method of screening urine.[49] A total of 357 random samples of mid-stream urine were screened by the BM-test-nitrite (a strip test based on the classical Griess reagent), and compared with the triphenyl tetrazolium chloride test, the detection of albuminuria and the microscopic examination of an unstained and Gram-stained urine deposit. The presence of a significant infection was indicated by the culture of $10^5$ pathogens per millilitre of urine.

The BM-test-nitrite detected 70% of significant asymptomatic bacteriuria and compared favourably with all other methods used. Albuminuria was the least reliable sign. No false positive results were obtained with the BM-test-nitrite. By withholding micturition for a few hours, or by testing a concentrated specimen, the sensitivity of the test may be increased. The test strip was found to produce false negative results when bactericidal antimicrobial agents were used, and it was, therefore, of limited value in determining the response to chemotherapy. The BM-test-nitrite is merely a chemical screening test. The colour reagent present will turn pink in the presence of a certain concentration of nitrite. Consequently only those organisms which can reduce nitrate to nitrite will be detected. This involves mainly Gram-negative organisms and, in particular, E. coli, the most prevalent pathogen responsible for asymptomatic bacteriuria in pregnancy.

If only 60% of women with asymptomatic bacteriuria are detected by this test (and pyelonephritis be thereby

prevented), then this is surely much better than waiting for the development of a better technique. An incidental finding arising from this study was that 5,3% of patients examined had significant asymptomatic bacteriuria, a figure similar to that reported in the literature.

More recently, we evaluated a dip-slide inoculation technique (Uricult).[41] Using this method, the practitioner can, within 24 hours of taking a clean-catch specimen of urine and without any specialised equipment or knowledge, detect the presence of clinically significant bacteriuria (with at least as high a degree of accuracy as the standard laboratory method) and so be guided as to the chemotherapy indicated for that patient. In temperate climates incubation of the dip-slide is not necessary.

It is now possible to screen all patients attending an outpatient clinic by bacteriological culture, which gives an accurate result within 24 hours. However, it may prove too costly and the programme may need modifying so that all asymptomatic patients are screened with BM-test-nitrite. All positive urine specimens could then be immediately plated onto a Uricult dip-slide, and the patient instructed to return within 2 days. Patients in whom there is present or past evidence of urinary tract infection should be screened initially with the dip-slide.

Bacteriological tests on urine are of value only if the specimen is properly collected, and fresh. Patients should therefore be instructed to bring their urine specimens in their bladders!

## ASYMPTOMATIC VAGINAL DISEASE

In this category are included both venereal diseases, (syphilis and gonorrhoea) and other sexually transmitted diseases, such as *Trichomonas* vaginitis and candidiasis.

After declining remarkably in the immediate postwar years, there has been a sharp increase and steady upward trend in sexually transmitted disease. This phenomenon is world-wide and almost certainly due to the change in acceptable standards of sexual behaviour, combined with the contraceptive pill.

### Syphilis

Syphilis if untreated may undergo spontaneous cure; develop into a secondary phase of latency; or progress to a tertiary stage with manifestations of cardiovascular neurosyphilis in some 25% of patients.

The more recent the maternal infection, the more disastrous the effects on the foetus; within 6 - 12 months of maternal infection, the pregnancy will almost certainly result in abortion; during the second year of maternal infection the child might be born either dead, or with latent syphilis which might become clinically apparent later in childhood or early adult life.

It is true to say that virtually every pregnant patient is tested for syphilis at some stage during her pregnancy. This was widely practised in earlier days when syphilis was a prevalent infection and a common complication of pregnancy. Today, after a latent period of many years, screening for syphilis has once again become relevant.

Unfortunately, in the absence of clinical signs, there is still no satisfactory answer to what is the best means for detecting this disease. A recent review[42] indicated that there are 6 tests based on the presence of reagin in the blood, and 3 which measure specific antibodies.

To serve as a guide, the Cardiolipin Wassermann reaction or the VDRL slide test, or both, should be used. If positive, and to ensure against false positives, the Reiter protein complement fixation test, which assesses the presence of *Treponema* antibody, should be done.

The incidence and the effect of positive serology in patients attending the Obstetric Unit of Addington Hospital is being evaluated.[43]

## Gonorrhoea

The incidence of gonorrhoea has increased steadily and in certain countries it is said to be out of control. The clinical features of gonorrhoea are often very difficult to detect; at least half the women infected have no symptoms at all, and in at least 50% of cases, gonorrhoea is present with other symptomatic or clinically easily recognisable discharges such as *Trichomonas* vaginitis. The problem of diagnosis is compounded by the difficulty of culturing the organism. Even in the presence of infection, specimens taken for culture from the cervix or urethra, or both, will be positive in only 60 - 80% of cases.[42]

During pregnancy gonorrhoea is mainly hazardous for the child. Gonococcal ophthalmia neonatorum is very dangerous and may cause blindness within 2 days. The best treatment is the prophylactic treatment of the pregnant mother. In 1967 gonorrhoea was discovered in no less than 25 pregnant women attending the antenatal clinic at Hammersmith Hospital. In a recent survey of asymptomatic vaginal disease at Addington Hospital,[43] 8 patients were detected out of 631 tested. Although the number was small, the early detection and efficient treatment of these mothers eliminated the risk of morbidity in their infants.

## Trichomonas Vaginitis and Candidiasis

These are usually regarded as sexually transmitted diseases, and although they are not associated with obstetric morbidity *per se* they certainly do cause local irritation and discomfort.

The incidence of *Trichomonas* vaginitis is said to vary from 1,4% to 6,9% of healthy women, but it will also vary with the type of patient. Keighly[44] found that 70% of women prisoners (many of them prostitutes) had *Trichomonas* vaginitis. Of even greater importance, possibly, than the disease itself, is its close association with gonorrhoea. Tsao[45] recently found that of 1 466 females with gonorrhoea, 42% also had trichomoniasis, and that out of 1 335 females presenting with *Trichomonas* vaginitis, 46% had an associated gonorrhoea.

In the Addington Hospital survey,[43] 90 asymptomatic females had *Trichomonas* vaginitis, an incidence of 14,2%.

Pregnancy often predisposes to candidiasis because of the increased acidity of the vaginal wall. Liston and Cruickshank[46] found the fungus in 49 out of 200 women who were suffering from leucorrhoea. A surprising feature of our study[43] was that 169 out of the 631 'normal' women had candidiasis. It was particularly common among the Coloureds (31,2%). Moniliasis is sometimes a clinical feature of diabetes. If it is found, and there are prediabetic signs and symptoms, or if it is resistant to treatment, a glucose tolerance test should be done.

In summary, a survey of vaginal cultures in 631 apparently healthy women revealed 8 instances of gonorrhoea; 90 of *Trichomonas* vaginitis, and 169 of candidiasis. *Haemophilus vaginalis* was also cultured in 145 cases. Early treatment could thus be instituted and morbidity to foetus and mother prevented.

## CERVICAL CANCER

Cancer of the cervix uteri lends itself to easy and early detection. The earlier the stage of the cancer, the better the chances of cure. Although there is some suggestive evidence that invasive carcinoma of the cervix first passes through dysplastic and carcinoma *in situ* stages, there is equal evidence that not all carcinoma *in situ* lesions progress to invasive cancer. Because it is not possible to predict whether an epithelial lesion will become frankly malignant or not, it is best to screen all patients in 3 categories: normal, abnormal (carcinoma and carcinoma *in situ*) and suspect (dysplasia). Patients in the latter category should have repeated smears. If the dysplastic atypia persists, no intervention is necessary and the examination should be repeated 6 weeks after delivery. If inflammatory lesions such as *Trichomonas* vaginitis, or deficiency states, e.g. that of folic acid, are present, they may distort the normal cytology, and therefore these conditions must be treated before a definite diagnosis can be made. When cells suggestive of carcinoma *in situ* are detected in the smear, the patient must have multiple punch biopsy specimens taken of the cervix. Frankly malignant cells require confirmation by cone biopsy.

For some unknown reason, the fallacy of the 'false positive' smear in pregnancy has been perpetuated among obstetricians an gynaecologists. Atypical cells exfoliate from atypical epithelium and the lesion from which such cells originate must be located and examined histologically.[47,48] For example, during 1969, 2 500 Papanicolaou smears from pregnant women[49] attending Addington Hospital were studied; 1 119 were White and 1 381 Coloured. The youngest patient was 14 and the oldest 46 years of age. There were 14 reports of moderate to severe dysplasia. Biopsy provided histological evidence of carcinoma *in situ* in 0,23% of the Coloured and 0,27% of the White patients. During the same period, 7 334 women had smears examined as part of the Durban City Health campaign. Of 24 abnormal cytological reports, 17 were confirmed by histology to be carcinoma *in situ;* 2 had invasive carcinoma; 1 was negative and 5 were lost to follow-up. The incidence of neoplastic change in a slightly older, but otherwise comparable, group of non-pregnant women was 0,25%.

Pregnancy is one of the few physiological conditions for which most women seek medical advice. An excellent opportunity is thus provided to examine cytologically a large part of the population for the early detection of cervical cancer and possible precursors. Furthermore, cytological examination during pregnancy enables the obstetrician to identify inflammatory and other disorders in otherwise asymptomatic females.[43]

## SCREENING FOR OTHER DISEASES

There are other conditions which can be looked for during pregnancy—palpation of the breasts is one such routine procedure which occasionally reveals an unsuspected lesion. Another example is tuberculosis. The incidence of pulmonary TB in pregnancy is the same as that in the general population. Where this disease is prevalent, patients should have their chests X-rayed as a routine. Provided the lower abdomen is adequately protected, the foetus will receive a minimal amount of radiation. The possible ill-effects of undiagnosed pulmonary tuberculosis for the patient and her relatives far outweigh the small degree of radiation the foetus may receive.

## IS AN 'EARLY DETECTION PROGRAMME' FEASIBLE?

Apart from the accuracy and reliability of the various screening media, and the potential benefit for the patient, two more points need consideration in assessing the feasibility of an 'early detection programme': (*a*) the availability of personnel and the time taken to do the screening; and (*b*) the cost to the patient. In private practice, it should be relatively easy to screen for asymptomatic disease in pregnancy. Blood is taken as a routine for haemoglobin estimations and the Wassermann reaction, and most gynaecologists at the time of the initial pelvic examination to confirm pregnancy, take a Papanicolaou smear to screen for carcinoma and vaginal infections.

Urine is tested for glucose and albumin, but the value of this, except when albuminuria is a sign of developing toxaemia, is rather questionable. As was indicated previously, there would be more value in testing part of the urine specimen (preferably freshly voided) for asymptomatic bacteriuria; while one drop of blood is enough to assess the blood sugar level with Dextrostix.

It must be emphasised that all the tests need not be repeated at each visit. Screening for anaemia and diabetes can be conveniently performed, on the same blood specimen, at the patient's first visit and can be repeated at the 28th and 36th weeks of gestation. Test for asymptomatic bacteriuria, either the BM-test-nitrite, or Uricult dipslide, or both, should be done at least twice during the pregnancy. Only one Papanicolaou smear will be necessary provided a negative result is obtained.

A further advantage of screening in private practice is that active co-operation of the patient is easy to get. This is important for both the accuracy of the testing

(e.g. to request patients to have a high carbohydrate meal ± 2 hours before visiting the doctor when screening for diabetes) and for follow-up examinations during and after pregnancy.

These tests take only minutes and can be easily absorbed into the nursing sister's routine duties. The cost to the patient is minimal—in South African currency it should not amount to much more than R4,00.

In hospital practice, where there are larger numbers, a more detailed organisation of the system is required and the clinic budget would obviously need to be supplemented. Costs can however be trimmed, e.g. by screening for asymptomatic bacteriuria with the BM-test-nitrite first (cost ± 10 cents) and by using confirmatory Uricult dip slides (cost ± 70 cents) in positive cases only. Propaganda is necessary also to convince patients of the need for and the benefit of routine screening and regular attendance. The type of practice and the population group served also determine which conditions should come first. In our survey material, for example, the Natal Indians are known to have a peculiar predisposition to diabetes and iron deficiency anaemia. Among Blacks these two conditions are much less common and more benefit might be derived by concentrating on the detection of tuberculosis and urinary tract disease. By adapting the clinical resources to the medical needs of the population being served, a useful system of screening can be easily developed wherever pregnant women are cared for.

## WHAT CAN BE ACHIEVED?

The acceptance by individuals of the benefits of an early detection programme will be largely determined by the disease, its severity and stage. This may appear to be of little importance for the patient, but if it is neglected, the ultimate effect on the patient may prove disastrous, e.g. the development of chronic renal disease after asymptomatic bacteriuria. Carcinoma of the cervix uteri is another example of an equally 'silent' disease, but one which requires urgent treatment.

Whether the disease detected is of major or minor significance, its early diagnosis should lead to early cure.

Finally, by inviting patients to join a project such as that described, they would be encouraged to continue with regular medical check-ups after their pregnancy.

Statistics are often used to assess whether preventive measures, such as a well-women's clinic, are beneficial or not. Practising physicians, however, deal with individuals and not numbers.

Every doctor in practice can convert his surgery into an 'early detection unit' without undue inconvenience or cost to either himself or his patient.

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