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Obstetric Management of Toxemias of Pregnancy

by

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The objective management, of pregnancy toxemia is the prevention of maternal death or damaging sequelae, and the attainment of a healthy surviving baby. The direction of this presentation will be toward the realization of these objectives.

It would appear there is a "gray zone" of therapy which may be regarded as either obstetric or medical. Therapeutic measures recommended in their presentation will include those within this "gray zone". The discussion that follows will reflect our views first on prevention, followed by specific and definitive therapy, with some comments on after care for the toxemic patient. First to be considered will be the problems of mild preeclampsia, followed by severe toxemia with or without underlying hypertension, next, uncomplicated hypertensive disease, and lastly hypertensive states in pregnancy related to other specific diseases.

Prevention

Pre-eclampsia, in its more severe form, must be regarded, in part at least, as a preventable disease. Furthermore, the active treatment thereof is prevention of eclampsia. If not all eclampsia, surely antepartum eclampsia must be considered preventable. Whether or not the superimposed toxemia on hypertensive disease can be prevented is debatable. None-the-less, good antenatal care with early detection of blood pressure elevations from pre-existing established levels has much to offer.

Acceptable prenatal care, beginning early in the second trimester, combined with improved hygienic and nutritional standards will without any doubt significantly lower the incidence, severity and mortality of pregnancy toxemias.

Twenty years ago at the N. Y. Lying-In Hospital, the incidence of toxemia was 10%. Last years' figure was 4.6%[1]. Of the 254 toxemia patients, the distribution was as follows:

Table I

Distribution of Toxemia

New York Lying-In Hospital.

Antepartum eclampsia	1
Intrapartum eclampsia	1
Severe pre-eclampsia	27
Mild pre-eclampsia	146
Hypertensive disease with severe pre-eclampsia	4
Hypertensive disease with mild pre-eclampsia	9
Hypertensive disease	50
Renal disease with severe pre-eclampsia	3
Renal disease with mild pre-eclampsia	1
Renal hypertensive disease with severe pre-eclampsia	1
Renal hypertensive disease with mild pre-eclampsia	1
Renal hypertensive disease	8
Unclassified	2

It is evident that severe pre-eclampsia accounts for only about 10% of the total group. In 1948 this figure was 20% and at that time it

had already shown a significant decline from earlier years. Logical explanation for reduction of the overall incidence, and in a lessening of severe toxemia can be given to improved prenatal care, diet and other health factors.

Statistical material from other institutions show similar trends[2,3]. Better remembered perhaps is the classic statement of Carter[4] of Duke University; that the bad toxemia and the worst results seen in the United States are amongst the ill fed, ill housed, and ill clothed, back-woods "Hill Billies". Whitacre[5] with his many years of experience in China found the increase in the disease to be proportionate to the extent of indigency and poor nutrition of the lowest economic groups. As evidence however of the dual nature of the problem, in our state of New Jersey, severe toxemia is more common amongst private than clinic patients. This may be explained by the observation that in New Jersey antenatal care tends to be better in the clinics than in many private offices.

Specifically, in the prevention of toxemia, is the importance of management of weight gain. In the past, too much emphasis has been placed on the overall calorie gain in pregnancy as a danger sign. Weight gain, i.e., weight of patient after pregnancy as compared with that before, is associated with a similar change in the incidence of toxemia. Pre-existing obesity, as Nixon recently stated here[6], is quite another matter. And of even greater significance is the rate of weight gain, particularly in the last trimester. A gain of two pounds or more in a single week must be regarded as a sign beginning toxemia. Accordingly, every effort should be made in minimizing weight gain, particularly in the third trimester and particularly in the initially overweight patient.

The concern is not so much with an arbitrary "border-line" blood pressure, which by the way, is different in South-east Asia from accepted values in the United States, but rather to a sudden rise of systolic and diastolic pressures. A gain of 30 mm. systolic and 15 mm. diastolic, in a single week, must be regarded as a sign of toxemia[7]. While we have no reliable means of maintaining a **status quo** in the blood pressure system, we can use these figures as early warning signs, and take appropriate counteraction in terms of rest, sedation, and specific drug therapy.

Thirdly, in the prophylasis is the time-honoured restriction of salt and water. That edema can be related to excesses of these two factors is beyond dispute. The etiology of edema of pregnancy, however, and perhaps also the edema of toxemia, may not be so correlated. For this and other reasons, we no longer advise restriction of fluids. Indeed even the rationale for limitation of salt has come to be questioned. Recently, MacGillivray[8] of Aberdeen, on the basis of sodium excretion studies in both uncomplicated and toxemia pregnancies found that there is an average of 750 meq. of sodium retention in pregnancy which is quite physiologic. Moreover, edema of toxemia does not appear to be related to sodium retention. While impressed with this report, we certainly do not encourage the ingestion of other than the normal amounts of salt in pregnancy.

In the prevention of toxemia, and thus in good prenatal care, we should be cognizant of the increased risks for certain pre-disposed patients. A number of factors are known. In their studies of several groups of people in the Canal Zone, Scrimshaw and associate[9] found only one common denominator in predisposition to toxemia, namely adverse social and psychological factors. Chesley and associates[10] in the United States have shown, and recently Eleanor Adams[11] in Scotland substantiated the familial tendency in toxemia. Dr. Adams has shown furthermore, an increased incidence of the same type of hypertensive pregnancy within families.

There can be no question as to the predisposition of certain complications of pregnancy such as hydatidiform mole, chronic hypertension, diabetes and multiple pregnancy. When these obtain, let us be on guard. Let us restrict weight gain, and carefully check blood pressure and urine each visit. And when danger signs appear, immediate active management should be undertaken. "The transcendent importance of prenatal care is the early detection and management of the early signs and symptoms of toxemia".[2]

Therapy

The effective management of toxemia of pregnancy is best carried out in the hospital. This is true, regardless of type classification, whether it be for toxemia superimposed on hypertensive disease, or for the "pure" types. Therapeutic measures, in part medical and in part obstetrical, are essentially the same for both conditions, and will, for the severe types, be considered as one. Except for those mild cases which may respond to conservative therapy, the only completely effective treatment of severe toxemia is termination of the pregnancy. This does not imply that interference is ultimately necessary

in cases, either in the interests of the mother or the baby. It has been estimated that as high as 40 to 50% of patients with the mild disease and under adequate treatment, will show satisfactory response[12]. In these there will be no maternal deaths, and only an estimated 5% perinatal mortality [13]. Unless there is underlying hypertensive disease, even with prolonged conservative therapy, there is no clear-cut evidence today of permanent vascular damage to the mother.

All rational therapeutic measures are brought into play for their combined benefit to the patient. For purposes of this presentation an outline of obstetric management is offered. (See Table II).

Table II

Mild Pre-eclampsia Obstetric Therapy

1. Bed rest.
2. Sedation.
3. Careful medical and nursing surveilance.
4. Dietary restriction.
5. Blood pressure q. 4. hours.
6. Daily urinalysis.
7. Record daily: weight, fluid intake, urinary output.
8. Blood chemistries.
9. Fundiscopic examination.

Many years ago, Cosgrove and Chesley[14] were able to demonstrate that with bed-rest alone and without medication, improvement in the toxemia status was produced in about the same percentage of patients as when other measures and medications were added. In patients with pregnancy toxemia when the uterine blood flow is reduced by more than 50%[15], recent studies[6] using Na24 have disclosed an increase in uterine blood flow on bed rest alone. The importance of this simple but effective measure cannot be over-emphasized.

A variety of sedative drugs have been found useful in the management of pre-eclampsia, the barbiturates now being the most popular. Because of good sedative effect yet with a minimum of accompanying drowsiness, we prefer Dilantin-sodium in dosage of grains 1½ three time a day.

Careful medical and nursing surveilance demands frequent inquiry and observations as to the patient's progress. Included are the well known prodromal symptoms of headache, visual disturbances, epigastric pain, irritability, change in edema, blood pressure readings at intervals of four hours, daily record of fluid intake and urinary output, and daily weight. Clear, mid-stream, voided urine should be checked daily for protein and microscopic findings. Fundiscopic examination should be done every two to three days. Blood chemistries, in particular uric acid, CO2 combining power, and plasma proteins should also be determined.

A diet high in proteins and with a reasonable amount of salt, i.e. 3 grams a day, is ordered. Fluids are not restricted unless edema is pronounced. Diuretics are seldom necessary.

With improvement of the general condition of the patient, labor often intervenes. Induction prior to viability is rarely indicated and can seldom be justified.

Severe Pre-eclampsia and Eclampsia. Pre-eclampsia Superimposed on Hypertensive Disease.

There is general argument today that eclampsia can be regarded as an extension of severe pre-eclampsia. While hypertensive disease or renal disease, with superimposed pre-eclampsia are quite different entities in their origin, their similarities with pre-eclampsia are such as to allow their consideration here in terms of treatment.

Recognizing in these severe forms of toxemia quite a different and less favorable prognosis, the first objective of management is to produce a temporary improvement of the patient's toxic condition, including control of convulsions, if present. Once achieved, this should be followed by definitive therapy.

Initially, the obstetric management of the severe toxemia—Duncan Reid terms it the "second" or irreversible phase—is an extension and elaboration of that described above for the mild disease.

Table III

Severe Toxemias

Obstetric Therapy

1. Bed rest.
2. Sedation and specific drug therapy.
3. Constant medical and nursing attention.
4. Nothing by mouth during convulsions or or coma.
5. Oxygen following convulsions.
6. Blood pressure every 20 minutes to 1 hour as indicated.
7. Urinary output by catcheter if convulsions or coma are present. Daily urinalysis.

8. Blood chemistries.
9. Fundiscopic examination.
10. Subsequent termination of the pregnancy to be considered.

In the main, the first phase of management is that of an intensive twenty-four to forty-eight hours of conservative medical therapy. Sedative and specific drug therapy directed against the convulsions and the fulminating hypertension are at least temporarily effective. Often they are vitally necessary. In addition to the barbiturates, the early administration of morphine sulfate will usually prove effective in relieving apprehension and irritability. Magnesium sulfate in adequate amounts can stop convulsions. It is not without danger and toxic symptoms and antidote should be familiar to those using the drug. We prefer intramuscular injection of a 50% solution given initially as 10 Gm. and followed with 5 Gm. dosage at six hour intervals. In recent years we have learned to rely on the effectiveness and safety of reserpine. As recommended first by Assali[16], two-and-one-half to five mgms. may be given slowly by intravenous injection or drip often with dramatic improvement. It may be repeated in three or four hours if necessary. We have had little personal experience with the alkaloids of veratrum, but note your success in their usage here and also at the Boston Lying-In Hospital[17].

Supportive measures are vitally necessary. As listed in Table III, they are:—

Bed rest, constant medical and nursing surveilance is especially needed for the patient with fulminating pre-eclampsia and for the patient with convulsions and or coma. Dark, quiet surroundings are an aid to minimizing patient disturbance yet frequent blood pressure readings as often as twenty to sixty minutes, are necessary. Oral food and fluids are withheld during and following convulsions. Oxygen should be administered during and after seizures. An indwelling catheter for the critical patient will record urinary output. Fluid intake is also to be noted. Urinalysis including quantitative albumin, blood chemistries, and fundiscopic studies should be carried out and repeated daily if the conservative management is extended. When there is evidence of cardiac stress, particularly in the presence of edema, the patient should be digitalized.

Once the immediate critical phase has been bridged, the circumstances of the given patient should be assessed for consideration of interrupting the pregnancy. Failure to take advantage of this optimal time, as first enunciated by McLane[18], may lead to unfortunate results in intrauterine foetal death, and as well allow reactivation of the toxemia state. Fortunately in the "pure" toxemias the patient is usually near term with a viable foetus. In the patient with toxemia superimposed, particularly in the older grand multipara which you see comparatively often, the foetus may be small and but questionably viable. While there may be great temptation to postpone definitive treatment under these circumstances in the hope of gaining another few weeks for the foetus, such temporizing is generally ill advised. Experience has shown that foetal salvage is in fact worsened by such delayed action[2]. Indeed, even with intrauterine foetal death, improvement in the toxemia has been observed in less than one-third of cases[19]. Moreover, the maternal risk already increased ten fold, is further endangered by premature separation of the placenta or post-convulsive sequelae and may destroy the patient. [20, 10].

The aim must be then to deliver the patient as soon as possible and by the least traumatic method:

(1) If vaginal examination reveals the cervix favorable for induction and the os is dilated, stripping and artificial rupture of the membranes would be our choice.

(2) If the cervix is otherwise "ripe", but undilated, dilute pitocin intravenous drip induction may prove effective, to be followed if necessary by artificial rupture of the membranes. This would not be our choice, however, in the usual primigravida with severe toxemia, as the duration of labor so induced might be dangerously prolonged.

(3) In such patients, i.e., without cervical dilatation, and in all other circumstances, Caesarean section under regional conduction anaesthesia becomes the procedure of choice.

If vaginal delivery is permitted, every effort should be made to minimize the pain and stress of labor. Delivery should be conducted under local or pudendal block anaesthesia with the patient still in her quiet labor room and labor bed.

Subsequent Care

Our responsibilities do not of course end with the termination of the pregnancy. Post-

partum eclampsia, even as late as the eighth day[21], and other adverse sequelae may occur. Continued vigilance, medical and supportive measures will be necessary until all evidence of immediate risk to the patient have subsided. Before discharge from the hospital, a reassessment of the residual effect of the toxemia should be carried out including the usual renal function tests and eye-grounds studies.

Because of the shortened life expectance and risk of subsequent pregnancies in the hypertensive patient with superimposed toxemia, postpartum sterilization or sterilization at the time of Caesarean section should be offered. Even in the more mild forms of toxemia, it would seem reasonable to make available temporary birth control measures. Subsequent pregnancies need not be interdicted however in the otherwise uncomplicated "pure" pre-eclampsia, or even eclampsia. As shown by Dieckman[22] and more recently by Reid and Teel[23], such patients without underlying hypertensive disease have virtually no increased risk of hypertension in subsequent pregnancies. Likewise there appears to be no added risk for subsequent pregnancies of patients with uncomplicated hypertensive disease particularly for women under thirty-five. This opinion is based on statistical follow-up of such patients in England,[24] and in Denmark[25].

Essential Hypertension

Management of the patient with uncomplicated hypertensive disease must begin with her first prenatal visit. She should be thoroughly studied from a cardio-vascular-renal standpoint. If there is evidence of renal impairment, and/or advanced eye-ground changes, indicative of malignant hypertension, the pregnancy should be aborted followed by sterilization. If, however, the disease is mild, and at no time exhibits any evidence of overlay of toxemia, the pregnancy and parturition may be handled without any special obstetric measures. Prenatal visits should, of course, be more frequent in order to detect early signs of superimposed toxemia. When the disease is without added complication, both maternal and foetal prognosis are surprisingly good.

Hypertensive disease, frequently complicated by added toxemia (34-54%)[26, 27], is quite another matter. Under such circumstances, as previously mentioned, the foetal loss has been reliably reported[28] at 38% and the maternal mortality relatively high.

Hypertension in Pregnancy Related to other Diseases

Brief mention should be made of other causes of pregnancy hypertension. Additionally to be considered in the differential diagnosis are the following:

> Chronic nephritis, acute glomerulonephritis, unilateral pyelonephritis, congenital polycystic kidney, pheochromocytoma and coarctation of the aorta.

It is difficult and perhaps unwise to apply generalizations to these diseases in view of their relative rarity in association with pregnancy. Wilson[29], however, believes that in the renal diseases mentioned, the hypertension tends to simulate that of essential hypertension, being lower in the second trimester. In a review of 60 cases, he found in all but one, no evidence that pregnancy aggravated the nephritis or altered the natural course of the disease.

Sir Arthur Gemmell[30] reporting on pheochromocytoma—incidentally a disease of youth—found the blood pressure labile in pregnancy and related to waves of epinephrine release from the adrenal tumor (s). Diagnostic tests as perhaps you know are the response to the exhibition of histamine, or Regitine, or the detection of the catecholamines in the blood and urine. Treatment is directed at the tumor without regard for the pregnancy.

136 cases have been collected of pregnancy with complication of coarctation of the aorta[31]. Because of the frequent association with heart disease and the nature of the vascular lesion, the problem of management is more closely allied to congenital disease than to essential hypertension.

Summary

The objective of obstetric management of pregnancy toxemias is the prevention of maternal death and sequelae and the protection of the baby. It begins with adequate prenatal care. This together with socio-economic improvements with better nutrition and living standards can be expected to lower the incidence and severity of toxemia. Once a toxemia becomes manifest, it should be treated without delay in the hospital. Bed rest, sedation and supportive measures will in the mild, "labile", toxemia often produce a satisfactory response.

When this fails, or when a fulminating pre-eclampsia develope, with or without underlying hypertensive disease, a more vigorous conservative

program, including specific drug therapy, must be carried out. Following a stabilization of the toxemia, usually within twenty-four to forty-eight hours, consideration should be given to promptly terminating the pregnancy. The route and method of delivery will depend on the circumstances of the individual case. Postpartum sterilization will generally be indicated in the older multipara exhibiting superimposed toxemia, and in women with advanced hypertensive disease.

For the uncomplicated hypertensive patient and her baby, the outlook is good. Apart from close attention throughout pregnancy, no special obtetric measures will be required.

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