Over a period of 5 months 100 patients were treated (Table 1).

TABLE I

Incidence of Eclampsia and Severe Pre-Eclampsia

Condition	Number
Antepartum eclampsia	1
Intrapartum eclampsia	1
Postpartum eclampsia	6
Severe pre-eclampsia	92

By intravenous drug therapy, it was planned to adequately sedate the patient and produce a satisfactory drop in the blood pressure in 1-2 hours. It was anticipated that large doses of drugs would be required. A pilot study was therefore carried out in 20 patients: the clinical condition of the mother and response to treatment were studied; the efficacy of the obstetric management assessed; the condition of the neonate at birth and its subsequent progress followed. The results of the pilot study (to be published) amply justified adoption of the regime of management.

(A) Sedation

To produce sedation, *chloro-diazepoxide* (or librium) was used. This drug belongs to a group of new compounds acting mainly by depressing the reticular activating system and basal ganglia in the brain without any effect on the vital medullary centres. Few reports (Gilbert, 1961) on its use in pre-eclampsia have been published; its use in eclampsia has not been reported. Librium has been used in large doses with no unfavourable effects on mother or foetus (Jenny, 1963; Smith, 1960; Berger, 1961). To our patients an initial intravenous injection of 200 mg. was given and a further 200 mg. diluted in 500 ml. 5 per cent dextrose infused intravenously at 30 drops per minute. It was aimed to keep the patient asleep but easily aroused. When necessary 50 mg. librium was repeated intravenously. Maximum amount of the drug allowed in 24 hours was 800 mg. Observations on the sedative effects of the drug, the respiratory and pulse rates were made every 5 minutes during the first 30 minutes of treatment and every 30 minutes thereafter for 24 hours.

(B) Hypotensives

Three hypotensive drugs were used: puroverine (containing protoveratrine A), guanethedine and nepresol. Only one drug was administered to one patient, the drugs being used in rotation. In the first instance the drug was administered intravenously. Blood pressure recordings were made at 5 minute intervals during the first 30 minutes of treatment and at 30 minute intervals subsequently for 24 hours.

1. *Puroverine* 1 mg. was diluted in 500 ml. 5 per cent dextrose and 100 ml. run in rapidly, then continued at 20 drops per minute. Doses of 0·1 mg. were repeated as required. Complications like bradycardia were treated with atropine sulphate gr. 1/100 given intravenously.
2. *Nepresol* 25 mg. was given intravenously followed by 50 mg. diluted in 500 ml. 5 per cent dextrose infused at 30 drops per minute; 25 mg. doses were repeated as required. Maximum amount of nepresol allowed in 24 hours was 1,400 mg.
3. *Guanethedine* 20 mg. was given initially and 40 mg. diluted in 500 ml. 5 per cent dextrose infused at 30 drops per minute; 20 mg. doses were repeated as required.

(C) Diuretics

For patients with gross oedema 40 mg. fursemide (Lasix), a new sulphonamide diuretic, was administed intravenously, followed by 20 mg. daily or on alternate days. Records of fluid intake and urinary output were kept.

Obstetric Management

Obstetric assessment, including a vaginal examination, was carried out one hour after commencement of treatment. In eclamptic patients the management was precise. In primigravidae not in labour or with the cervix less than half dilated lower segment caesarean section was carried out. Caesaren section was also carried out in the presence of foetal distress or other indications. When labour was more advanced (cervix more than half dilated) vaginal delivery was allowed, after low amniotomy. In multigravidae not in labour and with the cervix unfavourable for surgical induction of labour, caesarean section was carried out. If the patient was in labour or if the cervix was favourable, low amniotomy was carried out. After 4 hours, if labour had not started or its progress unsatisfactory oxytocin drip was set up, except in the grandmultipara in whom caesarean section was performed. At the end of 8 hours after low amniotomy the progress of labour was reviewed; if progress was unsatisfactory caesarean section was carried out.

In patients with severe pre-eclampsia, when labour had already begun, it was expedited by low amniotomy. In the other patients if the pregnancy was advanced (36 weeks or more) and the foetus estimated to weigh 4½ pounds or more labour was induced by low amniotomy. In the remaining patients pregnancy was allowed to continue and the behaviour of blood pressure and extent of albuminuria followed. The growth of the foetus, amount of liquor amnii the progress of the patient's weight, the level of serial blood urea and uric acid estimations were also studied. Where response to treatment or progress of pregnancy was unsatisfactory or when complications like oliguria developed, pregnancy was terminated by induction of labour if conditions were satisfactory, or by elective caesarean section. When the period of gestation reached 36-37 weeks and the foetus estimated to weigh 4½ pounds or more induction of labour was carried out.

Results

Eleven of the 100 patients were primigravidae, 58 were grandmultiparae of whom 17 had delivered more than 10 children each (Table II).

TABLE II

Parity Distribution

Parity		Numbers
Para	1	11
Para	2—5	31
Para	6—9	41
Para	10+	17

Duration of gestation was below 36 weeks in 28 patients and only in 8 patients was pregnancy of 32 weeks or less in duration. In 10 patients the pregnancy had continued beyond 40 weeks, all these being unbooked patients. In all, 74 patients had not attended for antenatal care even once prior to admission. No previous history of hypertension or conditions associated with hypertension was available in any of the patients; it was thus difficult to assess the incidence of pre-eclampsia superimposed on hypertension. All pregnancies were singleton pregnancies. Other associated medical conditions, except probably diabetes mellitus in one patient, were not evident in the patients of this series.

TABLE III

Distribution of Period of Gestation

Period of Gestation	Numbers
32 weeks and less	8
33—36 weeks	20
37—38 weeks	17
39—40 weeks	33
40 weeks and more	10
Postpartum	12

TABLE IV

Response to Hypotensive Drugs

Hypotensive	Response			Total number of patients
	Good	Fair	Poor	
Nepresol	19	8	3	30
Puroverine	18	8	7	33
Guanethedine	13	11	9	33
None used	-	-	-	4

Results of Medical Menagement

Eighty-nine patients had no symptoms and with the initial 400 mg. librium, they remained adequately sedated. Four eclamptic patients were restless and drowsy on admission; they had all developed eclamptic convulsions at home. With 400 mg. librium one patient remained sedated and quiet; the 3 others required additional 100 mg. librium each over the first 2 hours. Three patients were admitted unconscious; in 2 there was a history of fits; they were adequately sedated with 400 mg. librium. The third patient was in deep coma, not responding to painful stimuli and had features of cerebral haemorrhage.

No patient in this series developed eclamptic convulsions after commencement of treatment. One patient with severe pre-eclampsia was restless and complained of severe frontal headache and epigastric pain. She required 650 mg. librium over the first 2 hours to be adequately sedated. Three other patients with severe pre-eclampsia complained of headache; they remained sedated and without symptoms with the usual dosage of librium.

Four patients with postpartum eclampsia had normal blood pressures. Thirty-three patients were treated with guanethedine, 33 with puroverine and 30 with nepresol (Table IV). The response was best with nepresol with which side effects too were minimal (Table V). Significant drops in blood pressure occurred within the first hour in 19 patients of the 30 treated with nepresol. The drop in blood pressure continued more gradually thereafter and a blood pressure within normal limits was readily sustained. Almost as good results were obtained with puroverine especially during the first hour. With puroverine the blood pressure could not, however, be sustained at a satisfactory level and stat doses of the drug had to be repeated more frequently. Puroverine was associated with most side effects, 7 patients developing vomiting; 2 developed bradycardia and in 2 others the blood pressure dropped precipitately (Table V). Guanethedine was disappointing, only 13 of 33 patients showing a satisfactory response and many patients requiring repeated doses.

Lasix was used in 77 patients with very satisfactory results. In most patients gross oedema was of rapid onset, in 7-10 days, its subsidence being rapid too.

Results of Obstetric Management

There was only one patient in this series who developed eclamptic convulsions before onset of labour; pregnancy was terminated, soon after the patient was adequately sedated, by caesarean section. One other eclamptic patient was in advanced labour on admission; she delivered without difficulty even before forceps delivery to shorten the second stage could be organised.

TABLE V

Side Effects with Hypotensive Drugs

Side Effects	Guanethedine	Puroverine	Apresoline
Vomiting	-	7	-
marked hypotension	-	2	-
Bradycardia	-	2	-
Bronchospasm	-	-	1

Forty-two patients with severe pre-eclampsia were in labour on admission. Amniotomy was performed in 37, the membranes having ruptured spontaneously in the remaining 5. Five patients required oxytocin drip to hasten labour. Thirty-six patients delivered normally, 2 were delivered by forceps to shorten the second stage. Caesarean Section (Table VI) was performed: in 2 patients due to unsatisfactory progress in labour despite oxytocin drip; due to foetal distress in one. In one other patient, diabetes mellitus was suspected and though the foetus was dead, Caesarean Section was carried out because of cephalo-pelvic disproportion and the maternal condition.

In 27 patients termination of pregnancy was decided upon soon after admission. Three were delivered by caesarean section (Table VI); in one patient the foetus was lying obliquely and in 2 others, both primigravidae, the cervix was considered not favourable for surgical induction. Surgical induction of labour was carried out in 24 patients. Five patients required oxytocin drip to help induce labour. In 2 of these caesarean section had to be performed because labour failed to ensue. One other patient, a gravida 13, was delivered by caesarean section also for failed induction of labour; oxytocin drip was not used. Of the 21 patients in whom labour was successfully induced by low amniotomy 2

TABLE VI

Indications for Caesarean Section

Indication	Admitted in labour	Pregnancy terminated on admission	Pregnancy conserved	Total
Eclampsia	-	1	-	1
Unfavourable for surgical induction (Primigravidae)	-	2	1 (Hystero -tomy)	3
Failed induction	-	3	2	5
Unsatisfactory progress of labour	2	-	2	4
Foetal distress	1	3	1	5
Cephalo-pelvic disproportion (also Diabetes)	1	-	-	1
Oblique lie	-	1	-	1

TABLE VII

Analysis of Foetal Loss

Number	State of Foetus on admission	Management of Pregnancy	Onset of Labour	Mode of delivery	Birth Weight in pounds & ounces	Probable cause of death and other details
1	Dead	Admitted in labour	-	LSCS	9-1	Intrauterine Hypoxia ? Diabetes LSCS for disproportion
2	Dead	Ignored	-	-	-	Mother died undelivered, 3 hours after admission, of cerebral haemorrhage
3	Alive	Pregnancy continued	Elective abdominal delivery, for uncontrolled pre-eclampsia. Before 36th week.	Hysterotomy	2-4	Foetal heart heard before operation. Delivered limp, without signs of life. Avoidable death.
4	Alive	Pregnancy continued	Induced, for uncontrolled pre-eclampsia. Before 36th week.	Normal	4-2	Foetal heart sounds suddenly ceased during labour. Avoidable death.
5	Alive	Pregnancy continued	Spontaneous. Before 36th week. Control of pre-eclampsia unsatisfactory	Normal	1-14	Macerated baby. ?Intrauterine hypoxia
6	Alive	Pregnancy continued	Spontaneous, before 36th week. Control of pre-eclampsia unsatisfactory	Normal	3-12	Macerated Baby. ?Intrauterine Hypoxia Avoidable death.
7	Alive	Admitted in labour	-	Normal	5-8	Very feeble at birth, after easy delivery. Apgar score 4, Neonatal death after 26 hours. ?Intrapartum hypoxia Avoidable death.

required oxytocin drip to hasten labour; in 3 patients caesarean section was carried out, foetal distress being the indication in all cases. Thus only 18 of 27 patients in this group delivered normally.

In 18 patients pregnancy was allowed to continue. In 12 patients the initial satisfactory response to treatment was not sustained. In 6 of them the condition deteriorated, requiring termination of pregnancy. The condition of the other 6 patients did not deteriorate, though improvement was not very satisfactory; pregnancy was allowed to continue but all 6 patients went into labour spontaneously before the 36th week. Only 6 patients remained clinically satisfactory, with no indication to interfere with the progress of pregnancy; 4 of these went into labour spontaneously before the 36th week leaving only 2 patients in whom surgical induction was carried out during the 36th week. Five of the 18 patients in this group were delivered by caesarean section, one by abdominal hysterotomy (Table VI).

One patient was admitted deeply comatose and the foetus dead. She died undelivered soon after admission. Twelve postpartum patients were included in this series (Table III). Six had developed eclamptic convulsions after delivery, and the other six had already delivered when the pre-eclamptic condition deteriorated from a mild form to severe pre-eclampsia.

Perinatal Mortality

The perinatal mortality rate was seven percent; 5 were stillbirths, one neonatal death and one intrauterine death with the mother dying undelivered (Table VII). In one other patient the foetus was already dead on admission. In 2 patients the pre-eclamptic condition had deteriorated, requiring termination of pregnancy before the 36th week. One patient was delivered by hysterotomy; the foetal heart sounds were audible before operation but at delivery the infant was stillborn; it weighed 2 pounds 4 ounces. In the other labour was induced by low amniotomy; the foetal heart sounds suddenly ceased, during labour; the infant weighed 4 pounds 2 ounces. Two patients belonged to the group in whom the maternal condition did not deteriorate though response to treatment was not satisfactory. Both patients went into labour spontaneously before 36th week and delivered macerated foetuses (Table VII). One patient admitted in labour, delivered a feeble infant (Apgar score 4) 7 hours later; the infant lived 26 hours; it weighed 5 pounds 8 ounces. Postmortem showed evidence of intrauterine hypoxia only.

Maternal Deaths

There were 2 maternal deaths. One unbooked Malay patient, a 38 years old gravida 12, 39 weeks pregnant, was admitted comatose, not responding even to painful stimuli. Further examination revealed: pyrexia of 105·8°F; respiration was laboured: pupils were markedly constricted and fixed: blood pressure was 180/110 mm. Hg. and pulse rate 132 per minute; there was generalised muscular paralysis with absent reflexes. On lumbar puncture, heavily and uniformly blood-stained cerebrospinal fluid was released under raised pressure. A diagnosis of cerebral haemorrhage involving the pontine region was made. The foetus was already dead. Treatment consisted mainly of coma nursing; hypotensives were prescribed. Her condition deteriorated rapidly and she died 3 hours after admission. Postmortem was refused on religious grounds. The other patient was also a Malay. She was 40 years old, gravida 13, and booked at the hospital when 40 weeks pregnant. She was very obese, with a blood pressure of 250/130 mm. Hg., oedema legs and trace of albuminuria. She had no symptoms. The foetus was of average size and foetal heart sounds were heard. Labour was surgically induced. Though the hypertension responded to treatment labour failed to ensue and caesarean section was performed. Postoperative recovery was satisfactory; on the 11th postoperative day, however, she developed cardiovascular collapse of acute onset, with dyspnoea, tachycardia 140 per minute, and blood pressure of 100/70 mm. Hg. Clinical impression was that of cardiac infarction this being confirmed on electrocardiography. Her condition deteriorated inspite of treatment and she died 12 hours later.

Discussion

Pre-eclampsia could of course be "cured" by terminating the pregnancy but, though this

disease is often confined to the last 8 weeks of pregnancy, for obvious reasons termination of pregnancy cannot always be carried out at its onset. Treatment therefore aims at preventing foetal and maternal complications resulting from pre-eclampsia till such time that pregnancy may be terminated. Adopting an intensive programme of antenatal care and advice Thoebald (1962) was able to effect a drop in the incidence of eclampsia to 7 cases in 35,000 deliveries (1:5,000). Stevenson (1958) reported no cases of eclampsia in 7,756 booked cases. In Kandang Kerbau Hospital where less than half the patients book for delivery, 45 cases of eclampsia were admitted during 1964 with an incidence of 1:880. Seventy-four patients in the present series had not attended for antenatal care prior to admission. Although pre-eclampsia is commoner in primigravidae, the grandmultiparae form the high risk group; these patients due to complacency or to demanding household chores are the chief defaulters at our clinic. They may book around the mid-trimester and their next visit will usually be when they are in labour or have persistent symptoms. Hypertension due to other causes are commoner in grandmultiparae and superimposed pre-eclampsia may occur earlier on in pregnancy.

It is difficult to compare our results with those reported by other workers. Only in very few reports has severe pre-eclampsia been analysed as an entity. Also our criteria for severe pre-eclampsia, based on local experience, may not be universally accepted. The results in this series show that the regime set out for treating eclampsia may profitably be adopted in treating severe pre-eclampsia and that the regime is not too drastic. It should be emphaeised that medical management consisting of empirically reducing blood pressure, producing sedation and eliminating oedema does not revert the pathological changes back to normal. Dieckmann and Harrod (1958) found no significant decrease in albuminuria or abruptio placentae in their treated cases. Until a great deal more about pre-eclampsia is understood adequate symptomatic medical management and good obstetric judgement will perforce be the basis of treatment in severe pre-eclampsia and eclampsia.

Patients with severe pre-eclampsia and eclampsia are very ill. Oral medicaments are unwise, for the stomach should preferably be kept empty until the condition of the patient improves; also effects of drugs administered orally are too inconsistent. To achieve rapid effects drugs are best administered intravenously as was done in this series. A continuous intravenous drip obtains a more balanced blood concentration, than intermittent injections, and the amount of drug administered is easier to control. Hypersensitive reactions to drugs would, however, be more marked when the intravenous route is used and the amount of fluid administered intravenously would have to be restricted in cases of oliguria or pulmonary oedema. Another feature of this series is that, pharmacologically, the drugs were administered in large doses. Unduly heavy sedation or large drops in blood pressure could produce adverse effects but such effects were guarded against by close supervision of patients. Close supervision was the most emphasised feature during management of patients in this series. The use of large doses has been vindicated by the pilot study and by the results in this series. Large doses were administered for short periods only (24-48 hours) and unfavourable complications were not noticed.

The principles of modern sedative therapy as outlined by Stroganoff (1930) are:—

i) prevention of afferent stimuli from reaching the patient;

ii) reduction in sensitivity of the central nervous system to external stimuli.

Afferent stimuli may be reduced by suitable nursing measures; or large areas of the body may be made insensitive to stimuli. Hingson (1949) used caudal anaesthesia with impressive results. This practice has, however, not received general acceptance. Numerous drugs like magnesium sulphate (Stroganoff, 1937), thiopentone sodium (Browne O'Donel, 1950), paraldehyde (Douglas and Linn 1942), choral hydrate and morphine (Stroganoff, 1930) and intravenous hypertonic dextrose (Cosgrove and Chesley, 1948) have been used extensively to reduce the sensitivity of the central nervous system. In many centres in the United Kingdom tribromethanol (Dewar and Morris 1947) is the drug of choice to achieve sedation in eclamptic patients. It is unsuitable for local climatic conditions because its solution rapidly undergoes degra-

dation. More recently derivates of promazine and promethazine have been used with considerable success. Krishna Menon (1961, 1960) using chlorpromazine and diethazine with pethidine reported excellent results in his large series. Lean (1962) used promazine and observed a favourable response in sedation with added benefit of lowering of blood pressure. However all these drugs have not been universally endorsed and the search for a suitable preparation continues.

The encouraging reports on the use of chlorodiazepoxide as a sedative (Jenny 1963), anxiolytic (Iborra 1963, Smith 1960) and anticonvulsive (Delvalle 1961, Kaim and Rosenstein 1960) agent prompted us to use the drug in severe pre-eclampsia and eclampsia. Our results have convinced us of the usefulness of librium. The drug was rapidly effective, its activity sustained for 8-12 hours. Patients remained well sedated, as though in deep slumber. Although easily waken up, the patient appeared quite uninterested in her surroundings and usually fell asleep again in a few minutes. Restlessness ceased, respiration was regular and not depressed, pulse rate remained within normal limits and pupillary responses remained satisfactory. No patient under treatment developed eclamptic convulsions; even patients whose blood pressure response to hypotensives was erratic remained sedated. Progress of labour was not affected in patients treated with librium; inefficient uterine action was not noticed. Recovery from the effects of the drug was satisfactory and unpleasant side effects like hypotension, vomiting, cardiac arrhythmia, respiratory depression were not noticed. The condition of the foetuses at birth and their subsequent progress did not implicate librium as being hazardous to the baby. It is anticipated from our results that librium in smaller doses may be used for all forms of pre-eclampsia.

An indeal hypotensive should counteract the hypertensive agent or agents in pre-eclamsia resulting in the blood pressure returning to the level normal for the individual patient. Such a drug is still to be discovered. In this series the concentration of the drugs used was aimed at obtaining a satisfactory response within the first two hours of treatment. Though the rapid drop in blood pressure (in some instances from 230/130 to 150/190) was clinically well tolerated by the patient more discriminating tests of the results of such sharp drops are necessary.

In some cases the apparent large drop may not be very significant for the blood pressure may be labile and with bed rest alone would drop to safer levels. Though hypotensives could not be expected to improve the pathological changes that had already occurred, hypotensive therapy may be considered valuable in preventing cerebral vascular accidents, pulmonary oedema and probably eclampsia.

It was decided to use three hypotensive drugs in rotation in this series and from the results to plan the pattern of hypotensive therapy in subsequent studies. Ganglion blocking drugs have not been useful in pre-eclampsia (Townsend 1959, Morris 1953, Agar et al 1958). Their effect is unpredictable, inconsistent and unsustained; part of their effect is postural and being confined to bed our patients would not be able to use this effect to advantage. Complications like constipation, neonatal ileus are not infrequent in cases treated with ganglion blocking hypotensives. Rauwolfia derivatives act slowly; also because of depletion of noradrenaline stores marked drops in blood pressure may occur at times of stress. The practice of stopping serpasil therapy 1-2 weeks prior to expected onset of labour is not feasible in patients with severe pre-eclampsia or eclampsia. Our experience with methyldopa has not been noteworthy. So veratrum alkaloids, guanethedine and hydrallazine compounds were used; these drugs have been used extensively in patients with pre-eclampsia (Ahmed 1962, Kabayashi 1962, Johnson and Thompson 1958, Farris and Krupp 1957, Dieckman and Harrod 1958, and Ellio 1959.)

The limitations of symptomatic drug therapy were most obvious in the case of hypotensives. Although a satisfactory response was obtained, the response was not always sustained. Suosequent rises were more erratic in their response to treatment. With puroverine in particular, the raised blood pressure appeared to become refractory after 48 hours; also puroverine was associated with most side effects, mainly vomiting. Our results with puroverine are quite unlike those reported by Winkler and Cangellow

(1958) or Elliot (1959). Elliot used smaller doses of the drug and reported very satisfactory results. Nepresol proved most useful; its action was rapid and prolonged and side effects were not observed. Nepresol's reputed action in increasing renal and placental blood flow further recommends its use. Nepresol may well be the only hypotensive drug to be used in our subsequent studies.

Fursemide was well tolerated by our patients and therapeutic results were very good. It is suited for patients with severe pre-eclampsia and eclampsia in the probability of impaired renal function, because it increases the glomerular filtrate (Vorburger 1964). Abnormal potassium loss is unusual with fursemide and has not been noted in this series.

When is it safe to perform caesarean section on an eclamptic patient? In this series it was planned to perform caesarean section soon after the patient was adequately sedated unless labour was advanced. This practice embodies current trend advocated by Krishna Menon (1961). He found that as the interval between first fit and delivery increased the maternal mortality also rose. He also noted that caesarean section could not be implicated as a cause of death. In our series this policy could not be tested for only one patient qualified for caesarean section on this indication.

The enthusiasm towards early delivery was carried over to patients with severe pre-eclampsia. Our results seem to justify this enthusiasm; in fact, of the 4 avoidable foetal losses (Table VII), in 3 instances a more energetic approach towards terminating pregnancy or a more liberal use of caesarean section might have saved the foetus. The enthusiasm towards early delivery did not bring about any serious foetal or maternal complication, although the caesarean section rate (including one hysterotomy) was 23 per cent.

Forty of the 42 patients admitted in labour were 36 or more weeks pregnant. The foetuses bore the stress of labour fairly well; only one foetus developed foetal distress; another was born feeble and died a day later. Labour was short, lasting 12-16 hours; oxytocin drip was not very helpful, being effective in helping progress of labour in only 3 out of 5 patients. The second stage should be shortened by low forceps delivery as this is a period of greater stress for the foetus and patient with severe pre-eclampsia.

Seven of the 27 patients in whom termination of pregnancy was decided on admission were below 36 weeks pregnant. Surgical induction was attempted only in 24 of them. In these selected patients surgical induction was successful in 21 only, a success rate of 87·5 per cent. Again oxytocin drip was not helpful, being effective in 3 of the 5 patients on whom it was used. It is probable that if a longer induction-onset of labour interval had been allowed the success rate of induction would have been higher. After a long induction-onset of labour interval the foetus would, however, be in a less fit state to withstand the stresses of labour. Foetal distress developed in 3 of 21 patients during the first stage of labour, and the neonates in these cases were smaller than expected.

Though the intra uterine environment in patients with severe pre eclampsia is definitely unfavourable for the foetus, unless the foetus is of reasonable size and maturity, it may not withstand the stresses involved during delivery and adaptation to the external environment. It was therefore decided that whenever possible, the estimated weight of the foetus should be around 4½ pounds and its maturity closer to 36 weeks before termination of pregnancy could be considered. This regime was fruitful only in 2 of the 18 patients where pregnancy was allowed to continue. In 33·3 per cent of these patients, the pre-eclamptic condition deteriorated; in another 33·3 per cent improvement was not very satisfactory. In the remaining 6 patients response to treatment was satisfactory but 4 patients went into labour spontaneously before the 36th week.

Continuing the pregnancy in patients not responding satisfactorily is apparently unwise; all 6 patients went into labour spontaneously before 36th week and 2 delivered macerated foetuses. One of these infants weighed 3 pounds 12 ounces and might have lived had pregnancy been terminated earlier. When the maternal condition deteriorates the foetus is indeed under great stress: in this group of 6 patients one foetus died while being delivered by hysterotomy and another died suddenly during labour.

Surgical induction of labour in patients with deteriorating severe pre-eclampsia was successful only in 3 of 5 patients, a success rate of 60 per cent: one of these patients subsequently required caesarean section for unsatisfactory progress of labour.

It is apparent from this series that obstetric judgement is severely put to the test in patients with severe pre-eclampsia. Individualisation is imperative. No ruling can generally be made as to when to terminate pregnancy or how. Assumption that criteria like estimated foetal weight of 4 pounds 8 ounces or duration of pregnancy at 36 weeks are prerequisites for termination of pregnancy may prove unwise. The temptation to allow the pregnancy to continue towards more maturity merely because the clinical condition of the patient is not deteriorating should be resisted. It is the small foetus in patients who develop severe pre-eclampsia earlier on in pregnancy that is at the greatest risk before and during labour and an earlier decision to terminate pregnancy, preferably by elective caesarean section, may be safer. Live premature infants delivered by caesarean section are no credit to a regime of management if the drop in stillbirth rate is offset by a rise in neonatal death rate. With painstaking paediatric care and the facilities available today, it is amazing how many of these feeble neonates thrive. It is our impression from this series that more foetuses would be lost by awaiting pregnancy to reach 36 weeks. Premature onset of labour is relatively common in patients with severe pre-eclampsia: 10 of the 12 patients in whom maturity to 36th week was awaited went into labour spontaneously before the 36th week. Surgical induction is not very successful, being more so, the less mature the pregnancy. Perhaps caesarean section may be more helpful unless conditons for surgical induction are very favourable. Patients who go into labour spontaneously may well require caesarean section for foetal distress and labour should be closely supervised.

About half the Caesarean Sections were performed because the responsiveness of the uterus was unfavourable (Table VI). The trial period allowed for the uterus was not as long as usual, however, but had this been allowed more than the 5 caesarean sections would have been performed for foetal distress during labour.

In only 2 cases were the indications for caesarean section not associated with pre-eclampsia (Table VI). One foetus died during abdominal delivery; it might have also died had labour been induced and allowed to progress: it weighed 2 pounds 4 ounces. The large foetus, weighing 9 pounds 1 ounce, (Table VII) migh have died before or during labour. One foetus died because severe foetal distress during labour was not detected. The foetus which was feeble at birth and died later must have also shown signs of distress during labour. Thus our perinatal mortality rate though small, could have been even smaller.

The factors that could have prevented the 2 maternal deaths are beyond the scope of the regime followed in this series. Both were Malay patients, old and very grandmultiparae. They had not attended for antenatal care and in one treatment was sought because she became comatose and the other only when labour had begun. With any form of management the maternal mortality in such a group of patients will be high.

Summary

1. A method of management of 100 consecutive cases of Severe Toxaemia of Pregnancy and Eclampsia is described.
2. The evolution and the mode of administration of a sedative agent viz. Chlor-Diazepoxide (Librium) and its very favourable results is emphasised. The drug may well be the ideal sedative to be recommended for use in this disorder of pregnancy.
3. Experience with three hypotensive agents viz. Puroverine (mainly Protoveratrine A), Guanethidine (Ismelin) and Nepresol—and their mode of administrations are described. Nepresol appears the most promising and most effective in the control of hypertension. It gave rise to little side-effects and may well prove to be ideal hypotensive for patients with Toxaemia of Pregnancy. Puroverine was associated with most side-effects including vomiting and bradycardia. The control of hypotension was fairly good immediately but unpredicatable after 24 hours. Guanethidine was disappointing.

4. The use of Fursemide (Lasix) in Toxaemic and eclamptic patients with exaggerated oedema in pregnancy appeared satisfactory and achieved the desired clinical results. No untoward reactions were noted in the 77 patients on whom the drug was used.
5. The outcome of the pregnancies of the 100 patients was described. The perinatal mortality rate of 7 per cent should be considered a good result. There were 4 avoidable foetal losses and it was pointed out that earlier termination of pregnancy might have helped in reducing this mortality—provided of course an effective and efficient premature nursery unit is available.
6. There were 2 cases resulting in maternal deaths giving a rate of 2 per cent or 0·2 per 1000. Both were in unbooked Malay patients—age over 35 years and over parity 10–conditions which, one may say, warrants the statement that both patients had "no business" to be pregnant. Avoidance of a pregnancy was certainly a preventive factor in both cases and the causes of death viz. intracranial haemorrhage and coronary infarction—emphasises the common mode and cause of death in these patients.

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