TREATMENT OF ABRUPTIO PLACENTAE*

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Until the exact cause of premature separation of the placenta is known, there will be a wide divergence of opinion on the treatment of abruptio placentae. Important advances have, however, recently been made, such as the identification of a correctable haemorrhagic diathesis due to hypofibrinogenaemia or afibrinogenaemia, and the introduction of the Bull regime of treatment of postpartum oliguria. These recent advances will probably save some lives, but in the majority of cases we are still faced with the problem of basic treatment, and the question often confronts us whether to induce labour, and whether to perform Caesarean section.

Almost in despair then, one is forced to analyse the results of treatment in large series of cases. In spite of many recent articles on the aspects of afibrinogenaemia and hypofibrinogenaemia, there is still a scarcity of reports of large series.

The present analysis is of a series of 688 cases of accidental haemorrhage; 653 having occurred in the Department of Obstetrics and Gynaecology at the University of Cape Town from 1949 to 1953, and 33 in the Department of Obstetrics and Gynaecology of the University of Stellenbosch during 1957. They are presented together because the basic approach in these cases has been similar in spite of their having been treated in different hospitals and by different consultants. I wish to thank Prof. J. T. Louw, of the University of Cape Town, sincerely for permission to present this analysis.

Grading of Abruptio Placentae

The cases have been graded as recommended by Page, King and Merrill,[5] whose method is summarized in Table I. When bleeding is fairly marked in grade 2, it corresponds to the so-called revealed accidental haemorrhage. In grade 3 there may be no external bleeding, but in rare instances a case may present with marked bleeding.

The clinical grading is made on the supposition that the amount of placental separation is proportional to the clinical signs. There are, however, some pitfalls in this assumption. For instance, abdominal tenderness and rigidity may be minimal in marked cases of retroplacental haemorrhage when the placenta is situated posteriorly. Moreover, the differentiation between grade 2 and grade 3 is sometimes very difficult, for signs of shock are often difficult to interpret in this condition. It is, for instance, well known that these patients, although severely shocked, may not show tachycardia; and a normal blood pressure may be misleading when it occurs in a shocked patient who has previously been hypertensive.

TABLE I. GRADING OF ABRUPTIO PLACENTAE

	Grade 1	*Grade* 2	*Grade* 3
External bleeding ..	Slight	More to marked	Slight
Abdominal tenderness and rigidity	None	Slight to moderate	Marked
Foetal heart sounds ..	Usually present	Present in 40-50%	Absent in 98%
Shock	Absent	Absent	Present

By this classification the number of cases occurring in the different grades, are as shown in Table II.

Prophylactic Treatment: Antenatal Care

O'Donel Browne[2] stated in 1952 that the improvement in antenatal supervision had produced disappointing results as regards abruptio placentae. He found that the percentage of foetal mortality was exactly the same in booked as in non-booked cases. In this series, in grade 2 there was a foetal mortality of 67% in non-booked cases as against 53% in booked cases.

In grades 2 and 3 there were 107 non-hypertensive cases, and in these cases antenatal supervision obviously could have made no difference. There were, however, 211 cases in grades 2 and 3 (i.e. 66%), where antenatal care, hypotensive drugs and earlier induction might possibly reduce the incidence of accidental haemorrhage. In this respect it should be noted that the average time of onset of accidental haemorrhage in the 19 patients of grade 2 and 3 in series B

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TABLE II. CLASSIFICATION IN GRADES

Series	Grade 1			Grade 2			Grade 3		
A	Hypertensives	129	354	Hypertensives	91	156	Hypertensives	109	143
	Non-hypertensives	255		Non-hypertensives ..	65		Non-hypertensives ..	34	
B	Hypertensives	5	14	Hypertensives	6	10	Hypertensives	5	9
	Non-hypertensives	9		Non-hypertensives ..	4		Non-hypertensives ..	4	
Total			368			166			152

Series A = 1949-1953. Series B = 1957. Grades 2+3: Hypertensives 211 (66%), non-hypertensives 107 (33%).

was 35 weeks. In 12 patients it occurred before 37 weeks, and in 7 patients after 37 weeks. It is also interesting to note that there were 6 maternal deaths from renal causes; all 6 patients were hypertensive, and all 6 were non-booked cases. Under these circumstances I feel that in Bellville and Cape Town strict antenatal care should be able to make some contribution towards lessening the incidence of abruptio placentae.

Treatment of Grade 1

Most authorities are agreed that conservative treatment is possible in the grade-1 type of case. It should be noted, however, that the foetal mortality, even in grade 1, ranges from 14% in series B to 20% in series A; this corresponds to the figure of 15% as reported by Townsend[8] in 1957. Hospitalization of these patients is therefore advised. A close watch should be kept on the foetal heart. One should be able to perform Caesarean section immediately if foetal distress develops in the first stage of labour, or a forceps delivery in the second stage of labour.

TREATMENT OF GRADES 2 AND 3

A. *Treatment for the Sake of the Baby*

(*a*) In grade 3, where the amount of separation is so much that it causes shock in the patient, it usually causes the death of the baby simultaneously. However, very rarely, cases may be found where foetal heart sounds are still heard. In this series there were 3 such cases. After shock had been treated, a Caesarean section was immediately done, but only one baby survived.

(*b*) In grade 2 the foetal mortality was 61·8%. Of a total of 170 cases, 65 babies survived, 85 babies were stillborn, and there were 20 neonatal deaths (Table III).

TABLE III. FOETAL MORTALITY IN GRADE 2

Series	Cases	Survived	Still-born	Neonatal Death	Total Died	% Died
A ..	160	59	83	18	101	63
B ..	10	6	2	2	4	40
Total ..	170	65	85	20	105	61·8

The obvious question one asks oneself here is whether Caesarean section is not indicated in every case in grade 2 in which the foetal heart is heard on admission? There are certain findings from this series (Table IV) which do not inspire one with enthusiasm to do routine Caesarean sections on all patients in which the foetal heart is heard:

TABLE IV. RESULTS IN 97 GRADE-2 CASES WITH FOETAL HEART HEARD ON ADMISSION

Caesarean section (17 cases)	Neonatal death	8
	Survived	9
Vaginal delivery (80 cases)	Stillborn	12
	Neonatal death	12
	Survived	56

Of 12 stillborn babies 9 could possibly have been saved by Caesarean section.

(*a*) 17 Caesarean sections were done for various reasons in cases in which the foetal heart was heard on admission, and only 9 babies survived, so that even with such a policy there would be an inevitable foetal loss.

(*b*) There were only 12 cases of 97 in which the foetal heart was heard on admission, and in which a vaginal delivery resulted in a stillborn baby. From close scrutiny of the case records, it is concluded that Caesarean section could possibly have saved 9 babies, but an unknown number might have died neonatally. There were 97 cases in which the foetal heart was heard on admission, and in 56 of these cases, vaginal delivery resulted in a liveborn baby which survived (i.e. 58%).

In practice therefore, in this series a policy of Caesarean section in each case in which the foetal heart was heard would have meant that 80 more Caesarean sections would have had to be done to save a possible maximum number of 9 more babies. In 56 cases the operation would definitely have been done unnecessarily, for in fact there were 56 babies who were born alive vaginally and survived. Under these circumstances I feel that there is no justification for a policy of routine Caesarean section on all cases in grade 2 in which the foetal heart is heard.

However, as the foetal mortality is undoubtedly very high, I feel that a Caesarean section is justified in selected cases, e.g. the 'very important baby'—when pregnancy has occurred after a long period of involuntary infertility. We are also now doing Caesarean sections in cases with hypertension and albuminuria who are not in labour, and where the baby is a reasonable size. This is done on the presumption that these babies are more sensitive to the relative anoxia which occurs as a result of the separation of the placenta.

In cases in which a vaginal delivery is allowed, it is imperative to keep a very close check on the foetal heart, and to prepare the theatre for an immediate Caesarean section should any signs of foetal distress become apparent.

Even with the most careful attention however, some babies will still be lost, for on occasion the foetal heart just suddenly disappears.

B. *Treatment for the Sake of the Mother*

The treatment applied in both series A and series B is basically the same, viz. a basic conservative approach. The patient is sedated and a blood transfusion given where necessary. During the course of time, however, a change of attitude has occurred concerning artificial rupture of the membranes. This has now become a routine part of the treatment. It stimulates labour and decreases the external bleeding when it is marked. Wiener[9] holds that it also lessens shock and prevents afibrinogenaemia from developing. Only in selected cases is Caesarean section performed.

According to Table V, 9 mothers died out of 318 in grades 2 and 3, i.e. 2·8% of all cases in grade 2 and 3 (or 3·5% of

TABLE V. TREATMENT IN GRADES 2 AND 3

Grade	Treatment	Total	Maternal Deaths: Renal	Maternal Deaths: Postpartum Bleeding
2	Conservative (39 blood transfusions)	122	2	2
	Artificial rupture of the membranes	27	0	0
	Caesarean section	17	0	0
3	Conservative (92 blood transfusions)	108	3	1
	Artificial rupture of the membranes	31	1	0
	Caesarean section	13	0	0
	Total	318	6	3

cases in which the baby died). This can be compared with a maternal mortality of 11·5% in a series reported by Sexton[6] in 1950, and of 10·7% in a series reported by Sheehan and Moore,[7] also in 1950. The following deductions can be made from this table:

1. Artificial rupture of the membranes on its own carries no extra risk for the mother. There was no case in which the general condition of the patient deteriorated as a result of artificial rupture. There was 1 maternal death in 58 cases in which the membranes were artificially ruptured, and it is doubtful whether the procedure contributed in any way to her death; she died 8 days later of a renal cortical necrosis.

2. Caesarean section in selected cases is a safe procedure. There were no maternal deaths in 30 Caesarean sections.

Indications for Caesarean Section

The indications in the 30 cases in this series in which casaerean section was performed are shown in Table VI.

TABLE VI. CAESAREAN SECTIONS

Grade	Total Cases	C.S. for Mother: Cases	C.S. for Mother: Indications	C.S. for Baby: Cases	C.S. for Baby: Survivals	Total C.S. Cases
2	166	6	Not in labour (3) Disproportion (1) ? Placenta praevia (2)	11	6	17
3	152	10	Not in labour (4) Oliguria or general deterioration (6)	3	1	13
Total	318	16		14	7	30

In order to consider the efficacy of this treatment for the mother, I shall deal with the maternal deaths in this series.

MATERNAL DEATHS

(*a*) *Oliguria* (*Table VII*)

Six patient died with postpartum oliguria.

Post-mortem findings. In 2 cases bilateral renal cortical necrosis was present—one patient died 6 days *post partum*, and the other 10 days *post partum*. They was both treated with one or other modification of the Bull regime involving reduced fluid intake. However, it is unlikely that any form of postpartum treatment would have altered the course of their illness. The post-mortem findings in another case were arteriolar necrosis as with malignant hypertension and, in another case, sub-acute glomerular nephritis. In the fifth case no cause of death was found, but for 6 days she had been receiving more than 4,000 ml. fluid intravenously. This was in the days before the Bull regime was started. The pulmonary oedema was probably the cause of death. In the sixth case a post-mortem was refused.

It is of interest to note that all these 6 patients were hypertensive. They were all emergency admissions—one patient died undelivered, whilst the other 5 were all delivered vaginally.

Here again, an important question is whether Caesarean section could possibly have saved the lives of any of these women. In 4 of the 6 cases it is unlikely that Caesarean section could have made any difference, since they were admitted in labour and they were delivered 1 hour, 6 hours, 6 hours and 9 hours respectively after admission. The fifth patient was admitted in a condition of irreversible shock, and died 9 hours after admission. In the remaining patient a Caesarean section might possibly have been beneficial. Although admitted in labour, she was only delivered 18 hours later, during which time she excreted only 2 oz. of urine.

It does, however, seem as if these patients were not transfused with adequate amounts of blood in the antepartum period. Only 3 of the 6 patients received any blood *ante partum*, whilst the amounts (1 pint, 1 pint and 2 pints respectively) were probably insufficient. One possible reason for this is that one is hesitant to give too much blood to a hypertensive patient. The problem is even more difficult with the non-booked hypertensive patient whose blood pressure before the accidental haemorrhage occurred is not known. With recovery from the shock following the initial blood transfusion, the blood pressure starts rising to perhaps 160/100 or higher, and one becomes hesitant to give more blood. Yet the patient may have lost 3 or 4 pints retroplacentally, which should be replaced.

We are now laying great stress on giving enough blood rapidly in order to prevent further shock and oliguria, and every patient with grade-3 abruptio placentae is given at least 2 pints of blood rapidly. Feeney[3] advises a minimum of 3 pints. Also, where so many of these cases are unbooked cases, there is a definite value in a 'flying squad' being sent to the patient so that a blood transfusion can be started in her home. In this way there is less delay in the treatment of the shock.

Where anuria, or oliguric excretion of less than 1 oz. per hour, occurs in spite of adequate transfusion, we believe that the uterus should be emptied. If the patient is not in strong labour, and her general condition is satisfactory, a Caesarean section is performed with an extradural block anaesthetic. We have no experience of bilateral splanchnic block as advised by Feeney.

With reference to the importance of giving enough blood, I should like to quote a paper of Townsend[8] from Melbourne. In his series of 158 patients, with severe grade-2 and grade-3 placental separation—*all* of whom had blood transfusion rapidly—there were only 2 cases of postpartum oliguria and *no* maternal deaths. There were only 7 Caesarean sections, performed for associated conditions, viz. severe pre-eclampsia, transverse lie, prolapsed cord, previous C.S., foetal distress first stage, unconfirmed placenta praevia (2 cases). One could hardly better such a series. Townsend suggests that his good results, and the low incidence of oliguria, are due to his regime of giving enough blood and giving it rapidly.

Perhaps the new work being done on serotonin estimation may throw light on the renal pathology which will make prophylactic treatment easier.

TABLE VII. FATAL CASES WITH OLIGURIA

Year	Parity	Age	Antenatal	Adm. in Labour	Between Admission and Delivery	Duration Pregnancy	B.P. (mm. Hg)	Alb.	Blood Transfusion	P.P.B.	Day of Death	P.M.	Remarks
1949	Gr.10 P.9	37	Non-booked	Yes	1 hour	34 weeks	170/110	2+	None	+	6th	Pulmonary oedema. No kidney lesion.	Too much intravenous fluids.
1952	Gr.1	28	Non-booked	Yes	18 hours	34 weeks	170/100	4+	2 pints antepartum	—	6th	Refused	Bull regime.
1952	Gr.12 P.11	56	Non-booked	Yes	6 hours	32 weeks	180/110	4+	4 pints postpartum	+	10th	Arteriolar necrosis as with malignant hypertension	Bull regime.
1952	Gr.5 P.1	38	Non-booked	Yes	6 hours	26 weeks	190/130	4+	None	—	6th	Bilateral renal cortical necrosis	Bull regime.
1953	Gr.4 P.2	30	Non-booked	?	Died undelivered	35 weeks	160/130	4+	1 pint antepartum		9 hrs. after admission	Subacute glomerulonephritis	Irreversible shock.
1957	Gr.4 P.2	34	Non-booked	Yes	9 hours	34 weeks	175/120	4+	1 pint	—	10th	Bilateral renal cortical necrosis	Bull regime.

TABLE VIII. FATAL CASES WITH POSTPARTUM BLEEDING

Year	Age	Parity	Antenatal	Baby	Blood Transfusion	Death	Treatment	P.M.	Remarks
1950	39	Gr.8 P.7	Non-booked	Stillborn	3 pints antepartum 16 pints postpartum	17 hours postpartum	Blood and uterus packed	Eclamptic liver	Uterus was well contracted.
1952	37	Gr.4 P.3	Non-booked	Alive	Blood postpartum	3½ hours postpartum	Blood and oxytocics	Anterior pituitary necrosis.	Bleeding controlled 1 hour before death.
1952	29	Gr.2 P.0	Booked	Stillborn	3 pints under pressure postpartum	3 hours postpartum	Blood and oxytocics	No abnormality.	

INCIDENCE OF POSTPARTUM BLEEDING
Grade 2: 55 out of 166 (33·1%)
Grade 3: 67 out of 152 (44%)
In last 19 cases Grade 2 and 3 (1957): there were 5 cases (26%) with 1 case of hypofibrinogenaemia.

The Postpartum Bleeding Group (Table VIII).

Three patients died with postpartum haemorrhage, the last death having occurred in 1952. No cases of hypo- or afibrinogenaemia were diagnosed before 1953. In the last 19 cases of grades 2 and 3 (in 1957), one case of hypofibrinogenaemia was found. However, it was not necessary to administer fibrinogen, for the blood clotted satisfactorily after 3 pints of blood had been transfused.

In the last 19 grade-2 and grade-3 cases in the series under report (occurring in 1957) there was still an incidence of 26% of postpartum bleeding, as against a 5% over-all incidence in the institution. This is also in spite of adequate antepartum blood transfusion and the administration of ergometrine and hyalase at the time of the birth of the anterior shoulder. However, only one case was very severe. The very severe cases of postpartum bleeding can usually be linked with a haemorrhagic diathesis due to a defect of blood clotting. To treat the postpartum bleeding it is merely necessary to correct this bleeding tendency with blood or fibrinogen, and there is no longer any necessity to do hysterectomies in this condition.

There is a difference of opinion about the incidence of blood-clotting defect in abruptio placentae. Townsend[8] reports an incidence of 3 in 150 moderate to severe cases, whereas Barry *et al.*[1] report that a degree of blood-clotting defect is present in every case of abruptio placentae where there is abdominal tenderness. Maisel and Cartnick[4] report from America that in 31,488 deliveries there were 6 cases of afibrinogenaemia necessitating fibrinogen therapy.

In practice it is found either that the blood fails to clot or that, even if it does, then a fragile type of clot is formed which dissolves in the serum within an hour. It has been shown that this clotting defect is due to a decrease of circulating fibrinogen to below 100 mg.% (the normal is ± 300 mg.%). This is correctable by giving double-strength plasma or blood, but in severe cases fibrinogen has to be given. Anything from 1 g. to 6 g. may be necessary. I have personally dealt with a case (with normal fibrinogen content) where the clotting defect was due to a factor-5 deficiency (not in this series). This is correctable only by transfusing freshly drawn blood, and in this case the clotting took place after 2 pints of fresh blood had been transfused.

It is also important to remember that it is better not to give dextran, because the large molecules may precipitate fibrinogen and cause a hypofibrinogenaemia.

MANAGEMENT OF SEVERE CASES

In conclusion, a short summary of the present management of severe grade-2 and grade-3 cases is given:

1. The patient is handled gently, morphine, gr. ¼, is injected, and oxygen is given by inhalation mask.

2. Blood is taken for grouping and cross-matching, and a coagulation test done. If a satisfactory clot forms in less than 10 minutes, there is no coagulation defect. The clot must be examined again after 1 hour for evidence of lysis. This test must be repeated frequently, especially if post-partum bleeding occurs later. Blood transfusion is started as soon as possible with blood as fresh as possible. While waiting for blood, we give intravenous glucose or plasma. If the blood does not clot, a quantitative test is done. Fibrindex is a useful and rapid rough test, while the Parfentjef test is an exact test which takes 20-30 minutes. If no improvement in the clotting takes place after 2 pints of blood have been given rapidly, it is probably wisest to give fibrinogen intravenously.

3. A rubber catheter is placed in the bladder, and excretion is charted hourly.

4. The membranes are ruptured in order to induce labour.

5. A vaginal delivery is awaited and a close check is kept on the pulse, the blood pressure, the abdominal girth and the foetal heart sounds (if present).

6. Caesarean section is performed for the baby's sake in grade 2 if the foetal heart is heard, the baby is a reasonable size, and the mother has hypertension and albuminuria; or if it is a 'very important baby' (e.g. elderly primigravida or long period of preceding involuntary infertility).

7. Caesarean section is performed for the mother's sake if she is not in labour and (*a*) there is diminished excretion of urine (less than 1 oz. per hour in spite of adequate transfusion), or (*b*) there is initial improvement which is not sustained and delivery does not seem imminent. One should first give more blood and then operate. In all cases where Caesarean section is done a check must be kept on the coagulability and the fibrinogen content of the blood. A Caesarean section is also performed when there is marked external bleeding not controllable by artificial rupture of the membranes.

8. For postpartum bleeding, oxytocics are given, and blood (fresh) and, if necessary, fibrinogen transfused.

9. For postpartum oliguria or anuria, 40% dextrose is given through a polythene catheter pushed into the inferior vena cava *via* the femoral vein. The daily amount is 600 c.c. plus the amount of fluid execreted or vomited. Vitamins are added, as well as heparin to prevent clotting. Sometimes alcohol also is added when more calories are needed. Testosterone is given by injection for its protein-sparing effect. For severe electrolytic imbalances dialysis with the artificial kidney is used.

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