

THE MANAGEMENT OF OBSTETRICAL HEMORRHAGE

HOWARD C. TAYLOR (*)

THE security of the mother has always been the greatest objective of the obstetrician and, in spite of great improvements, remains his chief responsibility. Among the hazards which the pregnant or parturient woman faces hemorrhage continues to be one of the most common. Constant re-examination of the methods of management of the several conditions leading to bleeding is therefore essential.

In this lecture, the subject will be approached first by a brief consideration of trends in maternal mortality statistics in the United States in order to place a proper value on the size of the problem offered by hemorrhage. From this starting point the subject will turn to a consideration of the different types of hemorrhage and the results of their treatment on the Obstetrical Service at the Columbia-Presbyterian Medical Center in New York.

There has of course been a world-wide decrease in maternal mortality rates and the curve of this decline has been duplicated in many countries. The decrease in maternal mortality in the U.S.A. since 1930, has indeed been very great. The maternal deaths for the country as a whole in 1930 numbered 60 in 10,000 deliveries; now the figure is 3.7 in 10,000 deliveries (Fig. 1).

The principal causes of maternal death have traditionally included toxemia of pregnancy, sepsis and hemorrhage. Abortion is sometimes given its own listing; but deaths following abortion may also be classified under sepsis and hemorrhage. It is of interest that in the U.S.A. deaths from all causes have diminished in about equal proportion (Fig. 2).

As a final point in introduction and to provide further background, it may be useful to note the causes of maternal death in our own institution (Table 1). Between 1949 and 1963 there were 60,830 deliveries with a total of 45 maternal deaths. The majority of these deaths, 31 altogether, were from constitutional disease and not from obstetrical causes. This high figure can be accounted for by the fact that our institution is a large general hospital for which the Obstetrical Service must handle all situations in which pregnancy complicates problems of severe medical or surgical disease. From strictly obstetrical causes there were six deaths from toxemia of pregnancy, six from complications of abortion and two from sepsis. One death occurred dur-

(*) The Sloane Hospital for Women of the Columbia Presbyterian Center in New York City.

ing a Cesarean section for premature separation of the placenta and one from hemorrhage in an unrecognized case of ectopic pregnancy. The record of only death from hemorrhage in the latter part of pregnancy, during labor or in the postpartum period is doubtless in part the result of good fortune, but also to the systematic application of strict rules of management and the use of modern scientific methods of blood replacement.

I would like now to discuss very briefly our experience with, and the principles of management of, the three major types of obstetrical hemorrhage, that from placenta praevia, that from premature separation of the placenta and that occurring post-partum.

PLACENTA PREVIA

In the fifteen years, from 1949 through 1963, our service delivered 60,830 women, and in this group there were encountered 207 cases of placenta previa (Table 2). Of these nearly three quarters were delivered by Cesarean section. Nearly a fifth of the babies were lost, chiefly as a result of prematurity. There were no maternal deaths.

The principles of the management of placenta previa have become rapidly standardized in recent years and it is to these that the improvement in maternal mortality may be attributed. The routine blood typing of all obstetrical patients and the maintenance of a blood bank are essential steps in the provision of security. Patients with any vaginal bleeding in the last trimester of pregnancy should be immediately hospitalized and no pelvic examination made until they are in a situation where transfusion and Cesarean section can be performed immediately, should hemorrhage be produced by the examination. Finally, according to our experience the majority of patients with placenta previa, certainly those with the central and partial varieties, are most safely delivered by Cesarean section. Opinions may, however, differ as to the exact proportion of cases which require the abdominal approach.

In spite of the favorable trend in the maternal mortality figures the high stillbirth and neonatal death rate remains, attributable to the fact that labor often occurs early in these patients or because an early delivery may be forced upon the obstetrician by the necessity of controlling threatening hemorrhage. Only under the most favorable conditions is it safe, in the presence of repeated episodes of bleeding, to attempt to postpone labor in the interest of fetal development.

PREMATURE SEPARATION OF THE PLACENTA

During the fifteen year period just noted there were 903 cases with a diagnosis of premature separation of the placenta. The figure is a relatively high one since the group contains many instances of relatively insignificant bleeding which could be classified under no other diagnostic heading.

The percentage of cases delivered by Cesarean section was only about twenty percent, a figure which would have been much higher had only the severer cases of separation been considered. About a quarter of all babies were lost, these being as a rule stillbirths resulting from intrauterine fetal asphyxia, rather than from prematurity as was the case in the placenta previa series.

The principles of treatment of hemorrhage from premature separation of the placenta begin, as is the case for all antepartum hemorrhage, with the requirement of universal blood typing and hospitalization. From there, however, differences begin to appear. In our series Cesarean section in premature separation of the placenta was not resorted to chiefly in the mother's interest, as was the case in placenta previa, but usually in an attempt to save the baby. Although in the very severe cases, with signs of "uterine apoplexy" and a dead fetus, Cesarean section may sometimes be the best method to save the mother, a commoner indication for the operation is found in the patient with the physical signs of a moderate degree of separation, when abdominal delivery may increase the chances of fetal survival. It is particularly in the management of premature separation of the placenta that the problem of hypofibrinogenemia is most frequently met with. This subject, since it is relatively new, will be dealt with separately toward the end of this lecture.

POST-PARTUM HEMORRHAGE

In the United States, a loss of 500 cc. of blood or more after the delivery of the infant is defined as "post-partum" hemorrhage. This may of course be due to a variety of causes, such as retention of the placenta or fragments of it, to uterine atony or to lacerations of the birth canal. Often of course the bleeding may be due to a combination of these. With this definition, that is to say a loss of 500 cc. or more, the incidence of significant post-partum bleeding in our institution was about two percent. The frequency of this complication has not changed during the fifteen years of our analysis.

The principles of treatment of post-partum hemorrhage are somewhat more difficult to define than those for the two preceding types of bleeding, since the causes are multiple. Long labor and traumatic delivery, as the most important predisposing causes, should of course be avoided. The uterine fundus should be constantly observed by a nurse or other attendant for at least an hour after delivery to detect the earliest signs of atony or filling with blood. The patient should be kept in a delivery or recovery room till all risk of hemorrhage is past. Oxytocic drugs, pituitrin or ergot derivatives, may be used routinely after delivery or only when a softening of the fundus indicates the medication. Persistence of bleeding, in the presence of a firm fundus, should lead to an examination for vaginal or cervical lacerations and perhaps to a manual

exploration of the interior of the uterus for fragments of retained placenta or membranes. Finally, there is the need to maintain blood volume by the replacement by transfusion of the blood that has been lost. Perhaps as a result of unpredictable redistribution of body fluids after delivery, post-partum patients may at times go into a state of shock from the loss of what appears to have been a relatively small volume of blood. For this reason early and adequate replacement of blood is essential. The occasional occurrence of intractable post-partum bleeding associated with hypofibrinogenemia has been noted and will be referred to later.

HEMORRHAGE FROM HYPOFIBRINOGENEMIA

There is finally one special type of hemorrhage to which particular reference should be made, since knowledge of it is relatively new and further because it has been a special object of study by a research group in my department.

For a while after replacement of blood by transfusion had become rather generalized, it seemed as if the problem of hemorrhage required only the perfection of organization to be entirely solved. However, at least two hazards remained. The first was effectively eliminated by the discovery of the Rh factor and the understanding of the formerly inexplicable transfusion reactions in iso-immunized mothers. The second hazard was the mysterious continuation of bleeding with failure of coagulation, especially in patients delivered after a premature separation of the placenta. This was finally shown to be due to a great decrease or indeed absence of the fibrinogen of the blood.

The syndrome of hypofibrinogenemia in its most typical form is easily recognized. After either spontaneous delivery or Cesarean section the patient, who has had a premature separation of the placenta, may continue to bleed in spite of all efforts at control. Blood taken in a test tube fails to clot or if a clot forms quickly disintegrates. Laboratory measurement of the fibrinogen content of the blood then shows that values have dropped from the 400 mgs. percent characteristic of pregnancy to below 100 mgs.

There are two rival theories as to the cause of hypofibrinogenemia in pregnancy (Table 5). One maintains that a thromboplastin-like substance is released from the decidua which causes the fibrinogen to coagulate and be deposited within the vessels so that the effective supply is used up. A second theory maintains that a fibrinolysin is produced in the injured uterine tissues and that this destroys both the fibrinogen circulating in the blood and the fibrin as it is formed in the clot. Perhaps both of these processes are at work and together prevent the normal process of coagulation. Bleeding must inevitably continue till the patient is exsanguinated or the defect is corrected.

The obstetrical condition in which hypofibrinogenemia is found most often in obstetrics is of course premature separation of the placenta (Table 6). It is furthermore the condition in which the most severe problems of hemorrhage are encountered. In the last ten years, thirty-six cases of premature separation with hypofibrinogenemia have been encountered in our Service and of these fourteen cases were severe enough so that fibrinogen was needed as a life saving measure.

It has become apparent, however, that hypofibrinogenemia may develop under other circumstances as well. The "syndrome of the dead fetus" is also one in which, following the delivery of an infant long dead in utero, there may be post-partum hemorrhage associated with a low blood value of fibrinogen. The fibrinogen levels may in fact become depressed in any condition in which remnants of placenta retained in utero become the source of a substance which causes either intravascular clotting or, the liberation of a fibrinolysin. The condition may accordingly be encountered after incomplete abortion and indeed several days post-partum when remnants of placenta caused late bleeding. Finally the loss of considerable amounts of blood, as in placenta previa, may much more rarely produce a hypofibrinogenemia either from actual blood loss or from the release of fibrinolysins as a result of hemorrhagic shock.

Although the situation produced by the coagulation defect resulting from hypofibrinogenemia produces a most critical situation, the condition has a specific remedy. The administration intravenously of fibrinogen, usually in amounts of 3 to 6 grams, quickly restores the clotting mechanism to normal and the patient again responds to all of the usual measures for the control of bleeding. Hypofibrinogenemia is fortunately rare but it may lead to fatal results unless it is recognized and the life saving procedure of fibrinogen administration is resorted to.

S U M M A R Y

The importance of obstetrical hemorrhage can still not be over-emphasized. Reference has been made to its significance as a cause of maternal death in the United States and to the frequency of this complication in a New York maternity hospital.

The essential steps in the management of obstetrical hemorrhage of each of the three main types have been outlined. Finally reference is made to the important development of the last decade, namely the new knowledge of the diagnosis and therapy of hypofibrinogenemia.

TABLE N° 1
MATERNAL DEATHS
AT THE COLUMBIA - PRESBYTERIAN MEDICAL CENTER

	1949-1953	1954-1958	1959-1963
Total Patients Delivered	18,421	20,578	21,831
Total Maternal Deaths	6	20	19
Hemorrhage	0	0	1
Sepsis	0	1	1
Toxemia	1	2	1
Abortion	0	2	4
Ectopic Pregnancy	1	0	0
Associated Non-Obstetrical Disease	4	15	12

TABLE N° 2
RESULTS OF TREATMENT OF PLACENTA PRAEVA
AT THE COLUMBIA - PRESBYTERIAN MEDICAL CENTER

	1949-1953	1954-1958	1959-1963
Total Patients Delivered	18,421	20,578	21,831
Total Cases Placenta Praevia	117	91	99
Percentage Cesarean Section	71.0	88.0	73.8
Percentage Perinatal Mortality	18.0	23.1	15.2
Maternal Deaths	0	0	0

TABLE N° 3
RESULTS OF TREATMENT OF PREMATURE SEPARATION
OF THE PLACENTA (ABRUPTIO PLACENTAE)
AT THE COLUMBIA - PRESBYTERIAN MEDICAL CENTER

	1949-1953	1954-1958	1959-1963
Total Patients Delivered	18,421	20,578	21,831
Total Cases of Premature Separation	262	240	401
Percentage Cesarean Section	23.6	26.2	15.7
Percentage Perinatal Mortality	27.0	27.1	21.7
Maternal Deaths	0	0	1

TABLE N° 4
POSTPARTUM HEMORRHAGE AS
MEASURED BY LOSS OF OVER 500 cc. BLOOD
AT THE COLUMBIA - PRESBYTERIAN MEDICAL CENTER

	1949-1953	1954-1958	1959-1963
Total Patients Delivered	18,421	20,578	21,831
Patients with Blood Loss over 500 c.c.	474	389	480
Percentage of Patients with Blood Loss over 500 c.c.	2.57	1.89	2.20
Maternal Deaths	0	0	0

TABLE N° 5

THEORIES OF CAUSES OF OBSTETRICAL HYPOFIBRINOGENEMIA

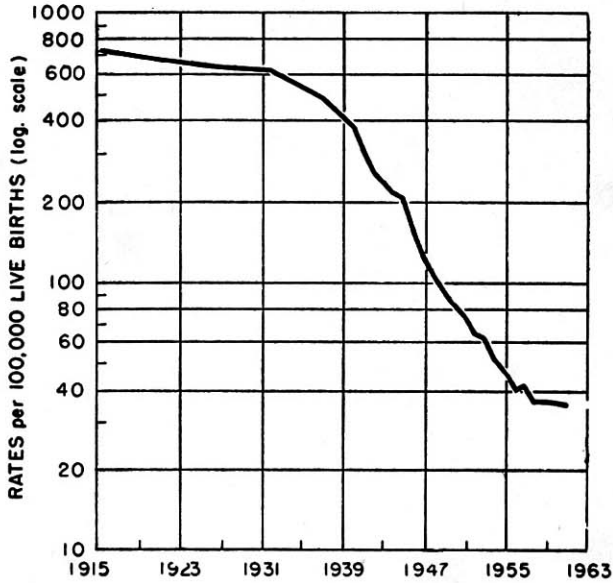
1. Loss of Fibrinogen through Intravascular deposit of Fibrin as a result of release of a thromboplastin from decidue.
2. Destruction of Fibrinogen an Fibrin as a resulta of release of a Fibrinolysin.

TABLE N° 6

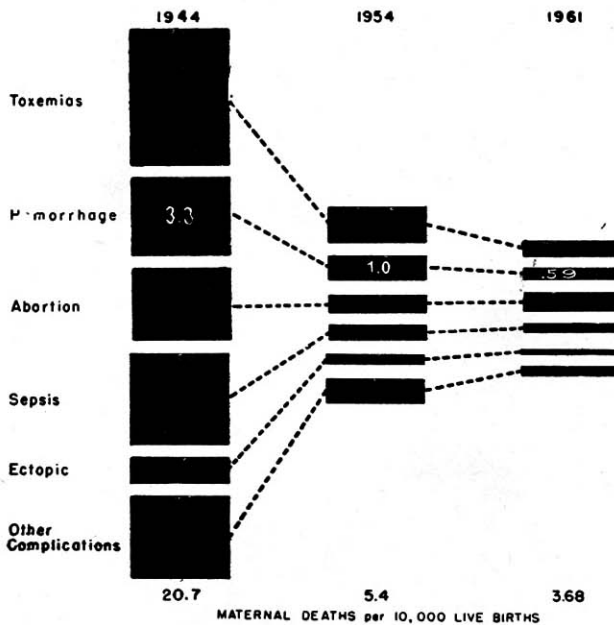
TEN YEAR EXPERIENCE WITH HYPOFIBRINOGENEMIA

	Total Cases	Receiving Fibrinogen
Premature separation of placenta	36	14
Intrauterine fetal death	30	5
Placenta previa	7	4
Post partum hemorrhage		
Immediate - atony	12	9
Delayed - retained secundines	5	1
Septic abortion	5	2
Leukemia	2	1
Ruptured uterus	2	1
Antepartum	2	1
Ammiotic fluid embolism	0	
T o t a l	101	38

MATERNAL MORTALITY IN THE U.S.A.



MAJOR CAUSE OF MATERNAL DEATHS IN U.S.A.



MANAGEMENT OF OBSTETRICAL HEMORRHAGE WITH SPECIAL CONSIDERATION OF HYPOFIBRINOGENEMIA

The discussion of the problem of obstetrical hemorrhage will be based on the 56,347 deliveries from 1949-1962 at The Sloane Hospital for Women, of the Columbia-Presbyterian Medical Center in New York City. During this period there were 291 cases of placenta praevia. In the entire group about 2 percent of all deliveries were associated with a blood loss of over 500 cc. Within the last ten years, 101 cases of hypofibrinogenemia have been observed and managed on this Service. On the basis of the above material certain general principles in regard to the management of obstetrical hemorrhage will be presented.

Howard C. Taylor, Jr., M.D.

S U M A R I O

Se discute el problema de la hemorragia obstétrica en base a 56,347 partos atendidos en el "Sloane Hospital for Women" del Centro Médico Columbia - Presbyterian. Durante este período hubo 291 casos de placenta previa. En 2% del total la hemorragia sobrepasó los 500 ml.

En los últimos 10 años se han observado y tratado 101 casos de hipofibrinogenemia, para lo cual se aconseja la administración endovenosa de 3 á 6 gramos de fibrinógeno.