

**RESUSCITATION, FROM IMPENDING DEATH DUE TO
CONCEALED HEMORRHAGE, BY THE INFUSION OF A LITRE
OF NORMAL SALT SOLUTION CENTRALLY
INTO THE RADIAL ARTERY.**

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(With one illustration.)

THERE is undoubtedly a strong tendency, shared by the medical profession in common with their lay brethren, to travel in cycles, to the disadvantage of the purely scientific aspects of the questions involved. This has been notably true of the life-saving operation of transfusion, which has several times passed through its periods of revival and neglect. To-day the attitude

seems to be one of general neglect, in spite of the numerous favorable opportunities offered in abdominal surgery in which transfusion would seem to be desirable; in spite also of the simplified technique of the procedure, which may well be called minor as an operation, while it is major in relation to the critical needs of the patient and its marvellous powers of restoration.

I have within the past ten months in six instances tested the life saving power of infusing normal salt solution into the vessels of patients apparently dying in collapse from hemorrhage. I wish at present to speak of but one of these cases, one of the rarest and most remarkable.

My patient was a large, florid primipara in robust health, 34 years old. I had found a distinct ring of albumin in her urine at each analysis for five weeks before her confinement was due. No casts could be found at any time. The only discomfort she experienced was due to the decided swelling of the legs. A restricted diet greatly aided this, improved her digestion, and made her comfortable.

On the 19th of October, 1893, at the calculated time, while lecturing to the class of nurses at the Johns Hopkins Hospital upon the duration of pregnancy, I was summoned in haste at 9 P.M. to the patient's bedside, and found her with a quickened pulse and feeble pains of short duration recurring at irregular intervals. Uterine contractions were distinct during the pains. The pain was not severe and was felt in the lower part of the stomach and back. Mrs. Miller, the trained nurse, whose assistance was invaluable throughout, at once informed me also that the patient had passed two large clots of blood before my arrival.

Upon examining the abdomen I found the child in the first position, but *no fetal pulse could be distinguished*. There seemed to be no unusual tenseness or bogginess about the uterus, which was, however, rather large. The examination through the inferior strait showed that the vagina was completely filled with large clots of blood, and that the cervix was high up and far back, dilated two and a half centimetres; its canal was still two centimetres long, with rigid walls. The head could not be felt through the cervix. In the place of the head was a mass of clots filling the lower part of the uterus. No placental tissue could be recognized among the clots. She did not present by the gaslight a markedly anemic appearance. Repeated examinations, both by auscultation and palpation, failed to give evidence

of fetal life. A strong placental bruit was heard high up over the left uterine cornu. The vagina was full of blood, and I noticed no difference in the discharge of blood during and between the pains.

Believing the case to be a lateral implantation of the placenta, I proceeded to turn and bring down the feet, assisted by Dr. J. G. Clark, gynecological resident at the Johns Hopkins Hospital, who administered chloroform. The patient was brought across the bed, with buttocks and hips resting upon my obstetric cushion, which served to catch all the discharges throughout. I was gradually able to work my hand into the narrow vaginal orifice and introduce two fingers into the cervix, with the intention of turning by combined external and internal manipulation, when I thought I ruptured the membranes. Upon pushing up the head, which was now felt above the cervix, a large gush of fluid followed; this was several times repeated, discharging so great a quantity that I remarked to Dr. Clark that we were dealing with a case of hydramnios. In all a litre and a half (three pints) was discharged, including the clots in the vagina. Upon inspection the whole of this discharged fluid proved to be black fluid blood mixed with coagula. No watery fluid whatever could be found. On sweeping the finger around within the os no placenta was touched. The true nature of the case was then evident: it was a concealed hemorrhage starting high up in the uterus, due to a premature spontaneous detachment of the placenta.

I at once introduced the hand into the now dilated cervix, and, pushing through the membranes, effected the escape of a small amount of amniotic fluid and brought down the right leg. We now suspended the chloroform, in hopes that the uterine contractions would follow and check the hemorrhage, and the rest of the birth take place spontaneously. There were, however, no efficient regular pains, and it was necessary to bring down the body gradually and release the arms. At this stage the uterus became markedly distended with coagula; the patient cried constantly with pains which seemed to have no expulsive action whatever; the pulse was also becoming rapid, running up to 132. Introducing the hand into the vagina over the abdominal surface of the child, which now presented with the face posteriorly to the right, the chin was drawn well down upon the chest, and by steady traction the head finally expelled with a moderate rupture at the vaginal outlet on the left side. The pulse after the delivery was 132, and she was complaining constantly and

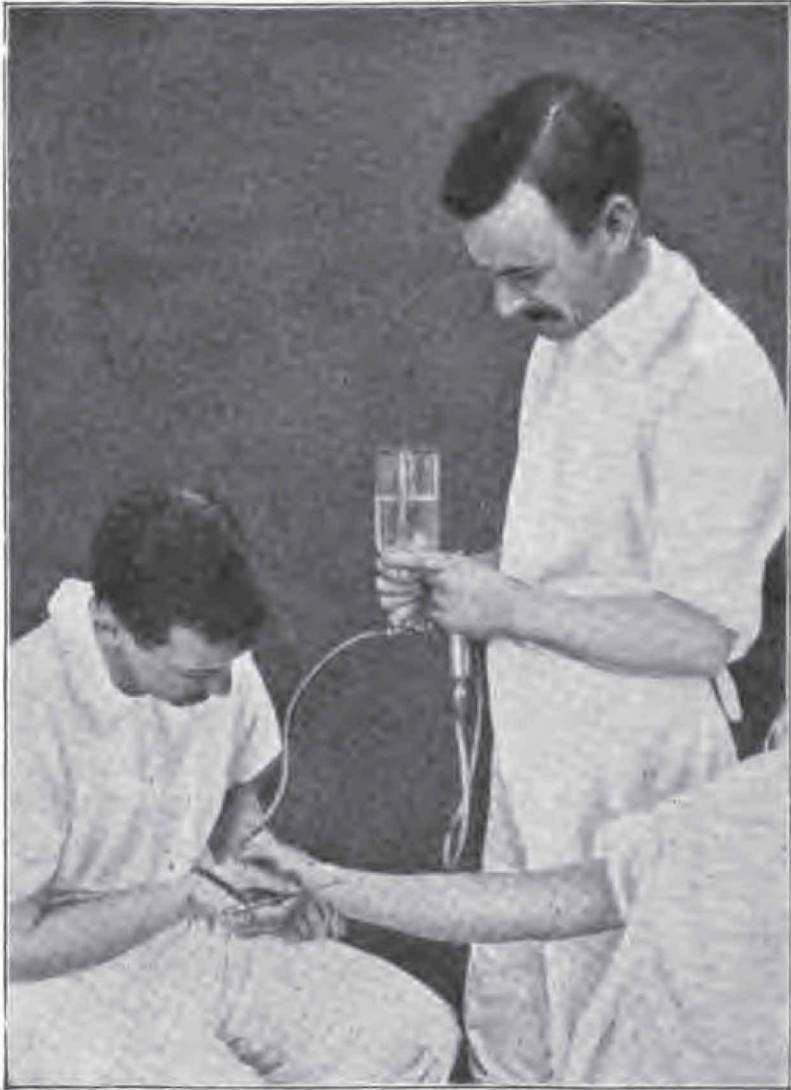
bitterly of severe pain. After keeping up the contraction of the uterus by pressure above, and finding that there was no tendency to expel the placenta, I introduced two fingers within the uterus and caught the placenta at the implantation of the cord in the upper segment of the uterus, attached upon the left side. It was tightly adherent and broke in several pieces in the delivery. The mass removed was large enough to be the whole placenta, and placental tissue was not felt in the uterus. The patient was now put back in bed, and the obstetric pad with its burden of blood, still-birth and amniotic fluids, etc., was carried out of the room.

She continued to cry out the whole night, profoundly shocked and only half-conscious. There was no hemorrhage and but a slight flow of blood, but each contraction of the uterus caused severe pain. She complained through the night of intense thirst—so great that when given water would hold the glass up and look at it as it grew less and stroke the glass affectionately. She suffered from extreme dyspnea, taking long, sighing inspirations in the effort to secure a deep breath; I counted from sixty to seventy efforts per minute. She constantly begged to be raised up, and lay tossing her head from side to side. The pulse was 167, without intermission or irregularity.

Toward morning she seemed to be growing weaker, and, in spite of several short naps, continued constantly to complain of agonizing pain. The passage of the catheter by the nurse caused such a loud outcry that I was inclined to interpret her general condition, in the light of this fact, as largely hysterical, thinking also that she must realize, what she had not been told, that the baby was not living. Two distinct uremic convulsions, separated by an interval of but a few minutes, occurred at about half-past 3 in the morning, marked by pallor, general twitching, turning inward of the eye, and stertorous breathing. About 8 o'clock I called my friend Dr. L. E. Neale in consultation, at the same time sending to the Johns Hopkins Hospital for instruments and assistants for abdominal section and transfusion.

Upon the arrival of my assistants, Drs. Cullen and Stokes, she was placed under the influence of chloroform and brought across the bed on to the writer's obstetrical pad, when Dr. Neale examined per vaginam and discovered in the uterus a piece of adherent placenta ten by three centimetres. This was readily removed and the uterus was washed out with hot water, and good contraction ensued.

Infusion.—The pulse of the patient, which had been rapid and feeble under the anesthetic, ceased entirely at the radial artery; and while the uterus was being douched with hot water I made an incision two centimetres long above the right wrist and exposed the radial artery, and introduced a fine canula in the



Infusion of normal salt solution. Operator holds canula introduced into right radial artery; assistant holds bottle of salt solution in right hand and force pump in left

direction of the heart, and by means of an inverted aspirating bottle containing the fluid, as suggested by Dr. Clark, I injected one litre of normal saline solution (six per cent). In manipulating the bottle the wrong cock was turned by mistake and some air injected, but without any ill effect. The result of

the transfusion was the immediate appearance of the opposite radial pulse, which within a few minutes dropped to 120 per minute. The superficial wrist wound was closed by suture and bandaged, and the patient returned to bed and systematic stimulation begun at once.

The after-history was as follows, briefly outlined : No vomiting during the first week. The uterus remained well contracted throughout. She had a free evacuation of the bowels in the afternoon of the day of transfusion. Her nourishment consisted largely of egg-albumen water for several days, when cream and milk were added. Hypodermics of strychnia (one-fortieth of a grain) were given hourly at first and discontinued on the second day. A severe vertical headache on the second day was relieved by small doses of phenacetin. She urinated eleven times on the second day, and on catheterizing I found twenty-two ounces of urine in the bladder. The pulse three hours after the transfusion was 172, then it dropped to 140, and on the following day to 126, on the third day to 116. On the eleventh day the pulse was 96. The temperature ranged from 99° to a little over 101°. Associated with this she had occasional severe headaches. She complained of severe pain, lasting several days, in the thumb on the side of transfusion. The bandage was taken off from the arm on the tenth day and the sutures removed. There was primary union throughout, leaving a linear scar three and a half centimetres. On the sixteenth day she sat up for an hour. On the fifteenth day the urine was acid and became decidedly milky upon boiling a filtered specimen, showing a marked decrease in the amount of albumin present. On the twenty-third day she developed a phlebitis in the right leg, from which she speedily recovered and is now in perfect health.

The only other case with which I am familiar in which life has been saved by this means after a hemorrhage of this character is that of Stopford Taylor in the *Lancet*, August 2d, 1879. On account of the importance of the matter I quote the account in full (see next page). It will be noted that the transfusion of blood from the patient's sister to the patient in that case was quite different from the simple central arterial infusion of warm salt solution in our case.

I will not discuss the subject further at this time, as I propose soon to consider the practical details, when I shall report other cases in which I have employed this mode of resuscitation in severe hemorrhages following gynecological operations.