THE NEWCASTLE-UPON-TYNE OBSTETRIC EMERGENCY SERVICE*

BY

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The Newcastle-upon-Tyne Obstetric Emergency Service has flourished since early in 1935, when it was founded by Prof. E. Farquhar Murray, and it is entirely due to his organization and enthusiasm that it has grown to its present strength. From that time until the end of 1946, 353 calls had been made, 8,356 miles travelled, 30 gallons of intravenous infusion given, and 37 women had died. It is felt that an assessment of its work would be timely.

This centre is probably unique in England for the reason that there is not another university centre within 120 miles to the northward and 90 miles to the southward. The furthest distances travelled have been: to the north, Berwick (64 miles); to the south, Barnard Castle (41 miles); and to the west, Haltwhistle (37 miles). The population in this area is about 2½ millions, though three towns—Sunderland, Stockton, and Darlington—have not made use of the facilities. With these exceptions arrangements for fees have been made with the local authorities. In 1935 only one call was made, but the next year there were 11, and by 1939 the number had risen to 47. The numbers fell during the war years, but rose in 1946 to a record of 56.

From time to time suggestions have been made that subsidiary centres should be established, and it is probably true that beyond thirty miles much of the value of the service is lost. There are, however, two necessities without which the service would be valueless. The first is frequent use: unless there is frequent need to resterilize the apparatus, and a quick turnover of blood and plasma, the use of these becomes dangerous. The second is that there should be available a person who is familiar with the urgent conditions met with, skilful, quick to handle infusion apparatus, and ready for any obstetric operation. While speed is desirable it is not nearly so important as these two factors, and it is unfortunate that the nickname "Flying Squad" has been applied to the service. The apparatus alone has always been available for use by any practitioner who wished; in actual fact, it has never once been called for without a request for the attendance of a consultant. In the early days of the service the aim was largely to render a woman temporarily fit to stand the ambulance journey to hospital. Intravenous saline was the most frequently used infusion, and it was not for some years that stored blood was available. Twenty-seven women who had suffered from loss of blood or shock were brought in after restorative measures and nine of them died. This high figure shows the danger of such a journey, which is nowadays almost never necessary.

The Apparatus and Routine

The apparatus consists of six items and is accompanied by a nurse who has packed the bags and is familiar with the place of every detail in them. (1) A large box containing drugs, anaesthetics, antiseptics, mackintoshes, and ready sterilized bowls, douche-can, syringes, intravenous sets, and a canvas roll of instruments. (2) A small box containing sterile gowns, towels, gloves, and dressings for

minor operative procedures. (3) A theatre drum with contents as No. 2, but in sufficient quantity to carry out an abdominal operation. (4) A crate of dried plasma, normal saline, and three or four pints of group O blood. It is hoped soon to provide a constant stock of group O Rh-negative blood and to carry it in a refrigerated container to avoid waste. (5) A bundle of blankets and hot-water bottles. These are scarcely ever needed, and now are often left behind. (6) A cylinder of oxygen and a B.L.B. mask. These have only rarely been needed.

A complete double set is available in case one set is already in use or is being prepared.

A practitioner faced with an obstetric emergency telephones the Princess Mary Maternity Hospital and makes his request. If he asks for a particular consultant, that consultant is communicated with first. Otherwise the consultants are telephoned in order of seniority until one is found available. It is thought to be essential for the efficient working of the service that a consultant should be quickly and immediately available, and it is no small pride to the Newcastle obstetricians that even in the war years a call has not gone unanswered. By the time the consultant reaches the hospital the nurse is ready with the apparatus. Using his own car, he transports all to the patient's house and carries out any treatment necessary—often some hours' work. When the nurse returns she at once prepares the gear for use again. As soon as possible after a case the practitioner notifies the medical officer of health. The hospital makes a charge of one guinea for its services, and the consultant sends in an account in accordance with an agreed scale, depending on the services rendered, the mileage, and the time of day or night, together with a short description of the conditions found. In some instances the local authority may recover all or part of the fees from the patient, or the service may be used for a purely private case.

Transport Difficulties

Mere distance is not such a difficulty as might be thought. There is a time lag of about twenty minutes getting the service into motion—taken in telephoning and reaching the hospital—so that even a case in the city is seldom reached in less than half an hour. At the other limit is Berwick, where a time lag of two hours may be reckoned from receipt of the call until the patient is under treatment. It is the experience of those operating the service that much of the mortality is due to deaths within a few minutes of the emergency arising. Women who survive half an hour it is usually possible to save within a reasonably longer time than this. On two occasions the squad failed to reach the patient. Once a car broke down, and a telephone call to the doctor showed that the emergency had passed. The second failure was due to a combination of an air raid, fog, and a very dark night with snow. Telephoned instructions were given to the doctor, and the next day the patient was brought into hospital, where she died. Great care must be used in taking exact instructions as to address, especially in the state of alarm that an obstetric emergency brings. Once a call came for Red Row. There are at least two villages in County Durham and two in Northumberland with this name. The fourth visited proved to be the right one. When nearing the objective small boys are easily the most efficient directors. At night take the local policeman aboard.

The Conditions Treated

Among the 353 cases treated there were 41 miscarriages, 20 ante-partum conditions, 45 intra-partum, 231 immediate post-partum, 15 late post-partum, and one not pregnant. They will be discussed under these headings.

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Miscarriages

There were 41 cases, with two deaths, in this group. It is very rare for a woman to die of blood loss from miscarriage, and both the deaths in this series were due to sepsis, one within half an hour of arrival of the squad and one a fortnight later. Most of these women appeared to be too ill to bear transport to hospital. I have vivid recollections of a woman blanched from an incomplete abortion in the loft of a pitman's cottage from which the only exit was through a hatch and down a ladder. Every time her feet were lowered to get her down the ladder she fainted, remaining unconscious for a long time. Transfusion and digital emptying of the uterus were carried out in the loft and she made an excellent recovery.

Ante-partum Conditions

The 20 cases (2 deaths) in the group were made up of 11 placenta praevia, 8 accidental haemorrhage, and 1 status eclampticus. Most of the haemorrhage cases received intravenous fluids and were then treated in various ways ranging from plugging of the vagina to caesarean section. Stored blood was not available until after 1940. Five of these cases were brought into hospital so that blood transfusion could be given, and it was in these five that the two deaths occurred. Since blood and plasma have been carried there has not been a single death in this group. Each of the two who died had intravenous glucose-saline, but the value of this was too temporary to protect her against an ambulance journey to hospital. They died shortly after admission, before blood transfusion could be established. There is no doubt that the pregnant woman who has lost blood must be saved an ambulance journey if at all possible, and this should be one of the prime objects of an obstetric emergency service. The patient with eclampsia had no further fits after the administration of morphine and intravenous magnesium sulphate. She was later safely delivered in hospital.

Intra-partum Conditions

Among the 45 cases (6 deaths) in this group were 13 of "failed forceps" with three deaths. Apart from one due to face presentation and one due to foetal malformation the causes of failure were the usual ones of occipito-posterior lie, incompletely dilated os, and the administration of pituitary extract in the first stages of labour. Other intra-partum emergencies were: obstruction due to monstrosity (7 cases, 1 death); prolonged labour (8); impacted transverse lie (2); breech (3); failure to deliver the aftercoming head (3); impacted shoulder (1); prolapse of cord (1); contracted pelvis (2); retained second twin (2); failed version with arm, leg, and cord prolapsed (1); diabetic coma (1 case, 1 death); and intra-partum rupture of caesarean scar (1 case, 1 death). In four of these cases the cord was prolapsed. These mischances will arise so long as district midwifery continues. The bad old system of transporting these gravely ill and shocked women to hospital lessened their chances of subsequent recovery. The salvage of infant life in this group is small, but it would certainly have been less still if domiciliary treatment could not have been carried out.

Immediate Post-partum Conditions

There were 231 cases, with 25 deaths. Fifteen patients were already dead when help arrived. It is in post-partum haemorrhage that the emergency service saves many lives and shows itself so dramatically necessary. Women blanched and moribund have been revived and restored to health. The lowest blood-pressure reading of a woman who recovered was 46/0, and systolic readings in the fifties are frequent. There were 186 cases of post-partum haemorrhage, divided into 88 with the placenta retained (8 deaths) and 98 after delivery of the placenta (10 deaths—3 associated with fibroids, 3 with heart disease, 6 with complete laceration of the perineum, and 1 with toxic goitre). There were, in addition to these cases of haemorrhage, 19 in which the placenta was retained without bleeding (2 deaths), 13 unexplained shock after delivery (1 death), 3 traumatic shock (1 death), 1 prolapse of cervix, 1 acute yellow atrophy of the liver (1 death), 4 incomplete rupture of the uterus (1 spontaneous), and 4 cases of acute inversion of the uterus (2 deaths).

With 18 deaths after post-partum haemorrhage in 186 cases it seems that some comment on the management of such

emergencies would not be out of place, for in many of the cases it was possible to surmise that had proper steps been taken earlier the emergency would never have arisen. The rarity of its occurrence in any one man's practice should not induce him to forget the grave condition that may arise if he does not act promptly when he has the first warning. In a great many instances a doctor was called in for post-partum haemorrhage by a midwife. All too often the subsequent treatment consisted of repeated and ever more forcible attempts to express the placenta by grasping the uterine fundus (so producing shock) and pushing downwards (so adding to it). Clot is repeatedly expressed, but the placenta does not follow, and in desperation oxytocics are given with the placenta still *in situ*. The bleeding ceases only when the woman is so exsanguinated and shocked that little blood is reaching the placental site. Should the placenta come away in the course of this treatment the woman is found to be white and collapsed.

In the normal delivery of the placenta the contracted uterus is used as a plunger to expel the placenta from the vault of the vagina or the lower uterine segment, and downward and backward pressure is correct; but no amount of downward and backward pressure will expel the placenta from the body of the uterus—it will merely produce shock by dragging on the broad ligaments and damaging the uterus and ovaries. The correct treatment is gentle massage of the uterus until it contracts, and if it fails to contract the accoucheur should proceed direct to the next step. If it contracts the fingers should be passed over the fundus and the organ squeezed as in squeezing a sponge. No pushing of the uterus downwards should be permitted unless and until the placenta separates.

If this manoeuvre is ineffective it should not be repeated; without any delay the placenta should be extracted manually, for repetition produces the rapid summation of haemorrhage and shock. Failure to go boldly on to this step before the woman has lost condition is due to the pernicious teaching that manual removal of the placenta is "the most dangerous operation in obstetrics." It is a life-saving operation. It is easier and less dangerous than the application of forceps. If the indications for expression of the placenta are there the indications for manual removal are there. So soon as the former fails the latter should be done. The frightening teaching about the operation has led not only to avoidance of it but to timid and half-hearted attempts to carry it out. A placenta inside the uterus can never be reached by two fingers or even the half hand in the vagina. In a gravely ill woman an anaesthetic may be dispensed with, but usually it will be necessary. The whole hand is introduced, and by making the other hand outside the uterus do the greater part of the work the placenta is separated by the well-known manoeuvre. The placenta is grasped and withdrawn. The hand immediately goes back into the uterus to make sure that every fragment of placental tissue has been removed.

Again teaching has been at fault in laying down that the hand should not be returned to the uterus once the placental site is laid bare. It should return as often as is necessary to be quite sure that not a fragment of placenta remains. With even a small piece of placenta left behind sepsis is almost inevitable. With an empty uterus it is rare. A douche is not necessary. If the readiness to perform forceps extraction of the child and the reluctance to perform manual removal of the placenta were reversed there would be many fewer calls on the emergency service. Seventy-seven placentae were removed manually in this series for post-partum haemorrhage. There were two deaths. One woman died six weeks later of heart disease and sepsis, and one failed to recover for no other reason than blood loss after having had the placenta removed. It does not appear that manual removal of the placenta is a dangerous operation. It is delay in its application that is perilous.

The four cases of acute inversion of the uterus are interesting. Two of these patients died before the squad arrived, a quarter and half an hour after the call was made. In one of the other two the uterus was immediately replaced and the patient made a good recovery; in the second it was replaced digitally four weeks later.

An unexplained and little-recorded type of case is that in which a woman is apparently dying with the placenta *in utero* though without bleeding and in which she recovers rapidly when

Table showing Types of Catastrophe met with

No.	Year	Diagnosis	Treatment	Remarks
1	1936	Retained placenta and P.P.H. Large uterine fibroid	Manual removal of placenta	Died three months later at operation for fibroid
2	1936	Impacted double monster	Delivery; intravenous saline; manual removal of placenta	Moribund on arrival
3	1938	Failed forceps; face presentation	Manual extraction of foetus and placenta	Died later of shock, haemorrhage, and sepsis
4	1938	Septic incomplete abortion	Oxygen	Moribund; died in half an hour
5	1938	xi-gravida; ruptured upper segment caesarean scar	Morphine; transport to hospital	Died half an hour after admission
6	1939	Incomplete abortion	Digital removal; blunt curettage	Died of sepsis a fortnight later
7	1939	Accidental haemorrhage	Intravenous saline (2 pts.: 1.14 litres); morphine; pituitary; transport to hospital	In hospital blood transfusion (1 pt.: 568 ml.); forceps delivery; died 5 hours after admission
8	1939	Accidental haemorrhage	Intravenous saline (2 pts.); morphine; rupture of membranes; transfer to hospital	In hospital blood transfusion. Died undelivered after three hours
9	1939	Post-partum shock after B.B.A.; submucous fibroid size grape-fruit	Transfer to hospital	Died 5 minutes after admission
10	1939	Moderate secondary P.P.H. 13 days after delivery; B.P. 80/44; removal of placental tissue; shock	Blood transfusion 12 oz. (340 ml.); morphine; lobeline	Died after three hours
11	1940	P.P.H. after delivery with placenta praevia	Intravenous saline (1½ pts.: 850 ml.); pituitary; transport to hospital	Died of blood loss 1½ hours after admission
12	1941	Failed forceps (twice) and pituitary extract shock	Blood transfusion; internal version and extraction	Died of shock soon after delivery; uterine wall intact
13	1942	P.P.H. and retained portion of placenta	Manual removal; transfer to hospital	Died 29 days later of mitral stenosis and sepsis
14	1942	P.P.H. from retained portion of placenta 12 hours after delivery	Removal of placental tissue; plasma (1 pt.); glucose-saline (1 pt.); transfer to hospital	Died 2 days later of acute yellow atrophy of the liver (necropsy)
15	1942	Shock and retained placenta	Plasma (1 pt.); manual removal of placenta	Died 19 hours later
16	1942	P.P.H. after twin; (1) normal delivery, (2) internal version after failed forceps; B.P. 76/40	Plasma (1 pt.); morphine; pituitrin	Died ½ hour after arrival of squad
17	1943	P.P.H. after accidental haemorrhage	Blood (1 pt.); admitted to hospital 7 days later	Blood transfusion in hospital; died next day
18	1944	P.P.H. with retained placenta	Plasma (1 pt.); manual removal of placenta	Good immediate response, but died 3 hours later
19	1945	Post-partum shock and retained placenta after normal delivery of macerated foetus	Plasma (2 pts.); transfer to hospital	Blood transfusion in hospital but died after 5 hours
20	1946	Gangrene of vagina; general septic peritonitis 2 days after forceps delivery	Blood (4 pts.: 2.27 litres); penicillin	Died in another hospital
21	1946	Labour with diabetic coma	Transport to hospital	Died in coma day after admission
22	1946	Three calls: (1) failed forceps, os ½; (2) failed forceps; (3) shock due to rupture of vaginal vault into broad ligament	(1) morphine; (2) forceps delivery; (3) blood (2 pts.); transfer to hospital	Died as laparotomy about to be done

the placenta is removed. In a recent case the first glance at the woman made one think the squad had arrived too late, but she was found to have a pulse of 170, though this was impalpable at the wrist. Three pints (1.7 litres) of blood did not materially improve her condition. Five minutes after expression of the placenta she was chatting about housing and the weather and asking for food; she seemed to be almost a normal post-partum woman. Acute inversion of the uterus is analogous, for if the woman can survive the replacement of the organ the shock rapidly goes.

Late Post-partum Conditions

Fifteen calls came into this group, with 2 deaths. The cases comprised pulmonary embolism (2), macrocytic anaemia of pregnancy (1), puerperal sepsis (2 cases, 1 death), secondary post-partum haemorrhage from retained portions of placenta (9 cases, 1 death), and secondary post-partum haemorrhage from lacerations (1). It can be taken as axiomatic that in the absence of lacerations secondary post-partum haemorrhage means a retained piece of placenta.

Not Pregnant Case

There was one case of metropathia haemorrhagica, blanched, fainting, and with no palpable pulse at the wrist, for which the service was used.

The Deaths

Of the 37 deaths 15 preceded the arrival of the squad. These 15 were made up of 2 with acute inversion of the uterus, 11 of post-partum haemorrhage, and 2 of post-partum shock. Eight were after normal delivery, 1 after twin, 1 after concealed accidental haemorrhage, 1 associated with shock after a difficult forceps delivery, and 1 after a difficult forceps delivery of a brow presentation in a woman with toxic goitre. The remaining 22 deaths occurred among 338 patients in whom treatment was possible. They are listed above as examples of the types of catastrophe which have been tackled. The acknowledged inadequacy of the nature and amount of intravenous infusions is noticeable in the earlier years. The introduction of an efficient blood bank was a gradual process, so that for some years blood was only available sporadically and then in small quantities. Now that there is always an available supply of blood, restorative measures can be undertaken with much more assurance of success.

Conclusion

It is a pity to end this account with a list of deaths. Rather should one say that out of 353 calls 338 patients were attended and 316 were saved. What proportion of these would have died without the attentions of the Emergency Service it is impossible to say, but many of them were so gravely ill that there can be little doubt that the number would have been large. In addition it is unquestioned that much subsequent ill-health was forestalled. There is little danger of the service degenerating into a replacement for hospital emergency admission, for the "nuisance value" of these cases in general practice is sufficient to deter practitioners from unnecessarily calling for domiciliary aid. With increased freedom of transport and release from some war conditions, greater demands are being made on the service (in the first half of 1947 the number of calls averaged two a week), but it is hoped that these demands will be met.

HASTINGS MEMORIAL AT WORCESTER

A memorial to Sir Charles Hastings, founder of the British Medical Association, was unveiled on Nov. 19 in the Board Room of Worcester Royal Infirmary, the room in which the Association was founded 115 years ago. The ceremony was performed by Dr. H. Guy Dain, Chairman of Council, who was accompanied by Mrs. Dain.

The memorial, which was erected by the Infirmary Committee of Management in 1943, is of oak, and bears the words, carved and gilded, "To the memory of Sir Charles Hastings, Doctor of Medicine and citizen of Worcester, who on July 18, 1832, in this room, founded the Provincial Medical and Surgical Association, which later became the British Medical Association." Above it hangs an engraving of Sir Charles Hastings, and below the inscription is the text of Sir Charles's address at the first meeting of the Provincial Medical and Surgical Association, with a short account of his life and work.

Dr. Dain said that the Provincial Medical and Surgical Association was founded in that room by some forty or fifty doctors from as far away as Bath, Bristol, Birmingham, Cheltenham, Warwick, Hereford, and elsewhere. With