

THE CAPE TOWN OBSTETRIC FLYING SQUAD*

ITS INCEPTION, ORGANIZATION AND OPERATION

C. J. HAGBERG, M.B., CH.B. (CAPE TOWN)

Registrar, Department of Obstetrics and Gynaecology, University of Cape Town and Cape Provincial Administration

In a country with adequate medical services there should be no need for an obstetric emergency unit, since in ideal circumstances every woman would be delivered of her child in a hospital. Disaster may strike at any time in labour. Delay in adequate treatment before transportation to hospital may well mean the difference between life and death.

A strong link exists between the obstetric emergency service and the University of Cape Town. The equipment was purchased by funds donated by the students' Hospital Rag committee. The service operates from, and admits to, hospitals which are attached to the medical faculty of the University. Senior medical students form an integral part of the unit, thus not only performing a useful function but also benefiting from a unique opportunity of seeing and studying the hazards of childbirth in patients who have not, in most cases, received antenatal care.

INCEPTION AND ORGANIZATION

In the 1920s and '30s, and before, many obstetrical and gynaecological procedures were carried out with relatively good results, in the patients' homes by the medical staff of district maternity services in England and Ireland. In the USA, as far back as the last decade of the 19th century, Joseph de Lee in his Chicago Maternity Centre was taking competent obstetric help, not only to his 'booked' cases, but to anyone who called for help. His work was carried on by Beatrice Tucker

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in a foundation whose finances were so slender during the depression years that the most urgent call had to be answered by a team travelling to the patient in a street car. In the UK the emergency obstetrical service, or 'flying squad', operated by an obstetric unit on an organized basis was initiated by the Newcastle-on-Tyne unit in 1935, by Farquhar Murray. Stabler¹ (1947), reviewing the activities of that service over 12 years, emphasized and brought to light the potentialities of emergency obstetric treatment in the home and showed that this service provided an indispensable means of providing the necessary treatment on the spot or rendering the patient fit to travel to hospital.

The Cape Peninsula provides a unique testing ground for the activities of an emergency obstetric unit; the beds available for routine and emergency obstetric care are grossly inadequate, and a large proportion of the population is not aware of the advantages of competent ante-partum and intra-partum care, which, moreover, is not always attainable. After many setbacks, the 'flying squad' answered its first call in September 1953.

The unit covers the whole of the Cape Peninsula and surrounding areas, and is available for any case on the district service of the Peninsula Maternity Hospital or the associated teaching hospitals. This, however, forms only a small part of the work of the unit. Any doctor or midwife faced with an obstetrical emergency may call on the services of the flying squad by telephoning the Peninsula Maternity Hospital, from which the unit operates. In the 33 months under review the squad has attended to 12 patients in private

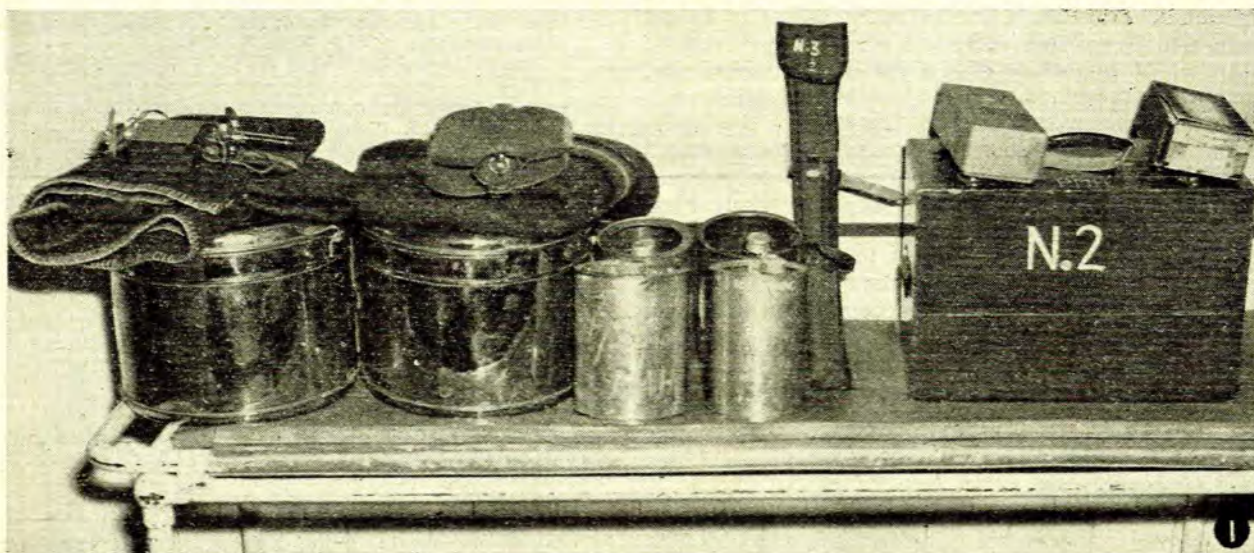


Fig. 1. Total equipment carried by the unit.

nursing homes or hospitals. No call, where the case falls under the category of cases normally handled by the unit, is ever refused.

Equipment

The equipment is housed at the Peninsula Maternity Hospital and there are 3 separate and complete sets, so that even if emergency calls come in rapid succession they may be answered. The equipment carried is detailed below:

Large wooden box, with folding lid, 2 sterile drums, blankets and hot-water bottles, headlight and battery. Blood-transfusion equipment as supplied by the Western Province Blood Transfusion Society. Collapsible centrifuge, telescopic drip-stand, 4 tins or more containing ice to carry the blood, and box containing laboratory requirements. The total equipment is shown in Fig. 1.

BOX

Jar containing scalpel blades and 2 needles in Dettol (each kind)	1 Bottle Acriflavine emulsion
2 Cheatle forceps	1 Bottle sterile water
1 Vacoliter normal saline	1 Bottle anaesthetic ether
1 Vacoliter dextrose 5% in water	1 Bottle cleansing ether
1 Bottle pure Dettol	1 Bottle Procaine 2%
1 Bottle Dettol cream	1 glass measure

The box is closed with two lids, each containing equipment.

LID 1

Ampoules of Coramine	Calcium gluconate
Ephedrine	Haemoklot
Amyl nitrate	Sodium citrate
Ergometrine 0.5 mg.	Pentothal sodium
Pitocin 5 units	Sterile water ampoules
Pituitrin 10 units	Atropine gr. 1/100
Vitamine K. 10 mg.	Noradrenaline

LID 2

3 Cotton bandages	1 Brush
1 Crepe bandage	1 Soap and box
1 Adhesive plaster	1 Pair Cheatle Forceps
1 Splint	1 Lotion thermometer
1 Sandbag	1 Clinical thermometer
1 Baumanometer	

BAG

1 Anaesthetic mask	1 Tongue forceps
2 Face pieces	1 Airway
1 Dropper	4 Masks
1 Mouth gag	

LARGE DRUM

2 Gowns	1 Pair packing forceps	} <i>On Safety Pin</i>
6 Dressing towels	2 Pairs scissors	
3 Dressing Macks.	1 Pair toothed dissecting forceps	
Wool swabs		
2 Gauze packings	4 Towel clips	
Gauze swabs	1 Long artery forceps	
2 Receivers	1 Speculum	
2 Bowls	1 Plain dissecting forceps	
1 20 c.c. syringe	Needles	
2 2 c.c. syringes		

SMALL DRUM (*rubber requisites*)

1 Douche can—complete with tubing, clip and nozzle	1 I.V. blood-giving set
3 Pairs gloves—sizes 8, 7½ and 7, with small towel for drying	1 Mucus catheter
	2 Catheters and cord ligature in bag.

LOOSE EQUIPMENT

1 Tin containing blood-taking set	1 Blanket pack, with 3 hot-water bottles each, which must be filled and inserted into pack at time of call.
1 Centrifuge	
1 Folding I.V. stand	
Bed-pan	

Staff and Transport

The members of the team proceeding to a call are made up of (1) Obstetric registrar and house-surgeon, if possible; (2) Trained sister or staff-nurse and pupil midwife; (3) Two medical students undergoing resident training in the hospital. (An obstetric registrar should be in charge of the squad, because the possession of sufficient obstetric experience is necessary in the type of case to which the unit is usually called.) If a medical practitioner has asked for the services of the squad, he is requested to remain with the patient until the unit arrives.

The team is transported by ambulance.*

The Operation of the Unit

As mentioned above, the aim of a flying squad is to treat the patient in the home (as far as possible) or to render her fit for transport to hospital.¹ This squad therefore performs two useful functions: firstly, it lessens the strain on the already overburdened hospitals and, secondly, it saves lives! The danger of transporting a severely ill and shocked patient, and the disastrous consequences, are too well known to require further elaboration.

The actual operation of the unit will now be described by giving a description of the routine for a call, followed by a review of the work of the unit in the 33 months since its inception, with some observations on the conditions treated.

Any practitioner or midwife faced with an obstetric emergency in the home or nursing home which may necessitate the attention of the squad telephones the Peninsula Maternity Hospital. The registrar and sister on duty are notified and an ambulance is called. Usually the squad is on its way within 15 minutes of the call being received.

On arrival, the registrar assesses the case and, after deciding whether it is one for complete treatment in the home or whether transport to hospital will be necessary, either dismisses the ambulance or detains it until resuscitative measures have been carried out and the patient is in a fit state to travel. If the former, the necessary treatment is carried out and when the patient's condition is satisfactory, the ambulance is re-summoned for transporting the unit back to base. Before departure, the patient is handed over to the private practitioner or midwife with further suggestions and/or instructions about her after-care. If it is decided that transportation to hospital is essential, she is admitted to one of the teaching hospitals.

REPORT ON FIRST 33 MONTHS

This review of the activities of the emergency obstetric unit, which commenced operations in September 1953,

* When the unit was instituted the ambulance service was operated by the Cape Provincial Administration. It is now operated by the local authorities.

covers the 33 months ending May 1956. The total number of calls received in this period was 192, of which 174 were from doctors and midwives and 18 from the district service of the Peninsula Maternity Hospital. Most of the patients were non-Europeans. There were 6 maternal deaths amongst the patients visited.

Fig. 2 shows the number of cases treated per month since the inception of the service. There are several points of interest in this graph. It shows a steadily

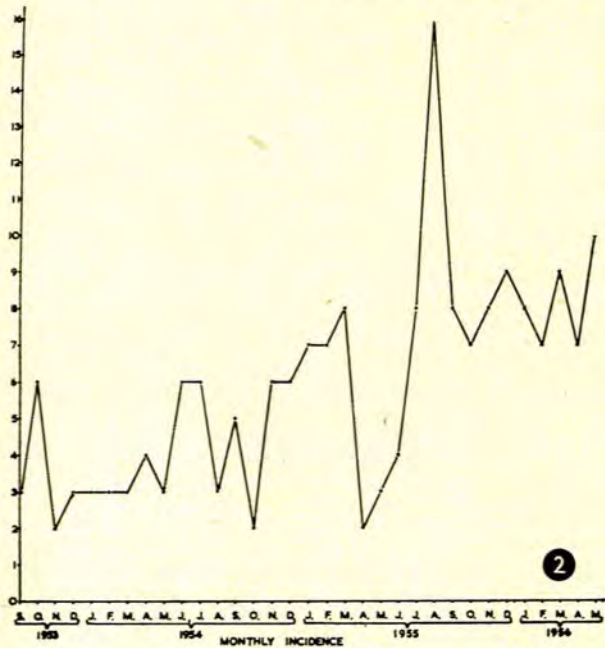


Fig. 2. Monthly incidence of calls September 1953 to May 1956.

increasing number of calls, starting with an average of 3-4 calls per month and reaching about 7 early in 1955. This was followed by a steep drop—due to newspaper publicity about the squad’s being ‘illegal’—the question arising because of official dissension about the role of the Provincial ambulance services in transporting the unit. At the present moment the unit is answering an average of 8 calls per month and the number is steadily rising.

The Areas Visited and Social Conditions Encountered

During the time it has been in operation the squad has visited almost every suburb and surrounding area of Cape Town. Of the 192 calls, 52 were in the area normally covered by the district service of the Peninsula Maternity Hospital (i.e. Cape Town, Woodstock, Salt River and Claremont); of these only 18 were cases under the care of the hospital, the remaining 34 being cases under the care of private practitioners, midwives, or no one at all! The next largest number of calls (28) came from Athlone, a large Coloured settlement and council housing scheme about 8 miles from the Peninsula Maternity Hospital. Windermere, a slum in the true sense of the word, accounted for 10 calls and the huge area of the Northern Suburbs (Mait-

land, Goodwood, Vasco, Parow and Bellville, with Tiervlei and Elsie’s River) for 47. The Cape Flats and other outlying districts were responsible for the remainder.

The conditions under which the squad operated amongst non-Europeans varied from the most suitable to the virtually impossible, from a modern council house to the worst ‘pondokkie’. In many cases, especially calls on the Cape Flats, it was necessary to carry the equipment over a mile or more of sand and bush as the ambulance could progress no further. In some cases it was necessary to transport the patient back over the same route—this time complete with intravenous drip. It is, I think, right at this point to emphasize that no patient treated by the squad ever succumbed in the ambulance or in the hospital to which she was transported.

Conditions Treated

Below is a statistical review of the activities of the squad during the 33 months under review:

POST-PARTUM HAEMORRHAGE			
PPH with retained placenta (on arrival)	..	..	60
PPH with placenta delivered (on arrival)	..	..	100
PPH with retained twin	..	..	2
PPH, secondary	..	..	3
Total post-partum haemorrhage	..	..	165

Thus post-partum haemorrhage in one or other of its forms was responsible for 165 of the total 192 calls. In the majority of cases the squad was faced on arrival with severely shocked and ensanguinated patients requiring energetic and immediate treatment. In only a few cases (10) was no treatment necessary.

In the 100 cases in which the *third stage was complete* on arrival, treatment was general—blood transfusion, catheterization, expulsion of intra-uterine clot and the administration of intravenous ergometrine. Very few (14) of these cases were transferred to hospital and this included 2 patients suffering from traumatic post-partum haemorrhage, who could not be treated at home. The squad remained with the patient until the systolic blood-pressure was 100 mm. Hg or over and her general condition satisfactory. In 3 cases the uterus was explored in the home and retained products removed.

Of the 60 cases of post-partum haemorrhage with *placenta retained in utero*, 33 had the placenta removed manually at home and 19 were transferred to hospital for manual removal; in 6 cases the placentae were expressed and 2 patients died with the placenta *in utero* (see under heading ‘maternal deaths’).

The method of treatment is described below. In some cases obviously the routine differed, but the majority were dealt with as detailed:

On arrival, the patient’s condition was assessed and intravenous infusion started immediately, after blood had been withdrawn for pre-transfusion tests. Intravenous ergometrine, 0.5 mg., was injected into the tubing of the drip. Blood transfusion was commenced as soon as possible. When the condition of the patient

improved and when her systolic blood-pressure reached 80 mm. Hg, an attempt was made at expressing the placenta; if this was not successful, manual removal was carried out. The total amount of blood given obviously depended upon the patient's condition. Injections of long-acting penicillin were given as well as a sedative.

In the early months of the operation of the squad manual removal of the placenta was carried out in the patient's home, in only a few cases, the majority being transferred to hospital as soon as their condition was satisfactory. Soon, however, it became essential to do this operation in the patient's home and it was apparent that the main obstacle to this procedure was the anaesthetic. This was usually administered by the general practitioner in charge of the case, using flying-squad equipment. Great difficulty was experienced because the patient had often been encouraged (possibly correctly) to take hot drinks (tea, hot milk, etc.) by relatives and the midwife. As a result of several extremely unpleasant experiences we decided to do our manual removals using intravenous morphine, gr. $\frac{1}{4}$, previously injected slowly into the tubing of the drip. Serial readings were recorded of blood pressure and pulse rate *before, during and after* the procedure in order to assess whether excess shock was produced by this manoeuvre. The method worked very well and further investigation into it in a larger series of cases is still in progress. There were no maternal deaths in the 33 cases of manual removal done in the home and the 19 done in hospital.

The 2 cases of post-partum haemorrhage *with a retained twin* were both extremely shocked and ensanguinated. After resuscitation the second twin was delivered and manual removal performed. Both patients recovered.

Of the 3 cases with *secondary post-partum haemorrhage*, 2 needed blood transfusion. All of them were transferred to a general hospital for further treatment.

CONDITIONS OTHER THAN POST-PARTUM HAEMORRHAGE

Ante-partum haemorrhage (various causes)	.. ..	14
Abortions	.. ..	3
Retained placenta (no PPH)	.. ..	5
Eclampsia	.. ..	4
Others	.. ..	1
Total	.. ..	27

In all the 14 cases of *ante-partum haemorrhage* resuscitative measures were the only procedure carried out. The patients were then admitted to one of our maternity hospitals for further treatment. The low figure of 3 *abortions* is a reflection of the fact that the squad very rarely treats such cases; all these patients were transferred to a general hospital. Not one of the cases required a blood transfusion.

The 4 cases of *eclampsia* were all emergencies as far as our institutions were concerned; one case had been booked in a private nursing home and 3 were patients due to be confined at home. Treatment consisted of intravenous pentothal, further sedation, intravenous magnesium sulphate and dextrose 50%, followed by transfer to hospital for further treatment.

The remaining case was one of iron-deficiency *anaemia*, which was only diagnosed post-partum. She was given a transfusion and transferred to a general hospital.

PROCEDURES CARRIED OUT

No. of cases given blood transfusion	.. ..	159
Pints of blood used	.. ..	282
Expression of placenta	.. ..	13
Manual removal of placenta—at home	.. ..	33
After transport to hospital	.. ..	19
Version and breech extraction	.. ..	1
Breech extraction	.. ..	1
Treatment for eclampsia (I.V. sedation, etc.)	.. ..	4

MATERNAL DEATHS

A review of the activities of the squad would not be complete without an analysis of the maternal deaths, of which there were 6. Of these, 3 patients were dead when the squad arrived; the remaining 3 succumbed within 15 minutes of arrival of the squad. The details are as follows:

Case 1

A.J., Ottery, 12 September 1953. Details are scanty. The patient had a private midwife, but a live baby was born without assistance and then a post-partum haemorrhage occurred. The mother was dead when the squad arrived.

Case 2

A.F., Grassy Park, 25 March 1954. Again the details are scanty. A manual removal was carried out by the patient's private doctor and was followed by collapse. She was dead when the squad arrived.

Case 3

N.W., Athlone, 12 January 1955. This patient was delivered of twins at home, and this was followed by retained placenta. Manual removal was carried out by the private doctor. Three hours later she collapsed. The squad was called 6 hours after delivery but the patient was dead on arrival.

Case 4

J.I., Woodstock, 13 March 1955. Age 28, gravida 3, 2 previous normal deliveries. The patient was delivered normally at 2.20 p.m. (private midwife). An immediate PPH followed, with retained placenta. The squad was called at 2.40 p.m. and arrived at 2.55 p.m. On arrival the patient was cold, virtually moribund, with no recordable blood-pressure or pulse. Placenta was *in situ*. Intravenous cut-down was done and blood transfusion started, but respiration ceased at 3.5 p.m., with no further response to resuscitation.

Case 5

M.O., Duinefontein, 25 October 1955. Age 25, gravida 5, 4 previous normal deliveries. After an ante-partum haemorrhage during the evening the patient was delivered of a stillborn infant at 10 p.m. The midwife left her and returned at 11.30 p.m. to find she had had a severe PPH. The squad was called at 11.45 p.m. and the patient was seen at 12.35 a.m., when the blood pressure was 50/0 mg. Hg, and the pulse imperceptible. The placenta had been delivered spontaneously and the uterus was hard and well contracted. A cut-down was done but as blood transfusion was commenced (12.50 a.m.) the patient died.

Case 6

P.M., Goodwood, 2 January 1956. Age 24, gravida 5, 3 previous normal deliveries. With the last delivery, in September 1954, the patient had been attended by the flying squad for post-partum haemorrhage. According to the untrained midwife in attendance the baby was born at 9.30 p.m. and the mother began to bleed, with no signs of separation of the placenta. The squad was called at 9.35 p.m., and arrived at 10.30 p.m., when the patient was found to be moribund, with an acute inversion of the uterus. She succumbed within 5 minutes of the arrival of the squad, before positive action could be undertaken.

Comment: Three of these deaths could obviously not have been avoided by the personnel of the flying squad and it is extremely doubtful whether anything could have been done for the remaining 3. It is significant that 2 of the deaths followed manual removal without pre- or post-operative resuscitation, whereas in the 52 cases where shock and haemorrhage were treated before manual removal there were no deaths. Case 6 was obviously a woman who should never have been confined at home (many of the cases treated by the unit fell within this category). Cases 4 and 5 were gravida 3 and 4 respectively with previous normal obstetric histories who, if they had been booked at an institution, would have been delivered in their homes by the district maternity service, yet one died within 40 minutes of delivery and the other (who had been unable to obtain a booking in a hospital earlier in her pregnancy) could not be admitted as an emergency when she had an ante-partum haemorrhage, as there was no bed available, even as an emergency. Particularly as she was delivered by a widwife who left her to attend another confinement, her death must be attributed to the inadequate maternity services at present existing in the Peninsula.

CONCLUSION

It seems certain that the flying squad has justified its existence. The idea behind the service could be applied

with advantage to almost every other branch of medicine. The advantages of emergency treatment on the spot before transport to hospital are multiple and one wonders how many lives would be saved if it were universally carried out.

SUMMARY

1. An account is given of the inception, organization and operation of the Cape Town Obstetric Flying Squad.
2. A statistical review of the activities of the unit is given and methods of treatment discussed.
3. A survey is made of the maternal deaths occurring on the service.

Thanks are due to the University of Cape Town Students' Hospital Rag Fund for its generous donation which enabled costly equipment to be purchased, to the nursing staff of the Peninsula Maternity Hospital for their competent aid in these extreme emergencies, to the ambulance services for their cooperation and help, and to the resident medical students for always lending a keen helping hand.

I am also indebted to the Superintendent of the Peninsula Maternity Hospital for permission to publish this review and to Prof. James T. Louw for his constant help and encouragement.

REFERENCE

1. Stabler, F. (1947): B.M.J., 2, 878.