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War injuries treated under primitive circumstances: experiences in an Ugandan mission hospital.

CHRISTINA M DE WIND FRCS
Resident Surgeon, Mengo Hospital, Kampala, Uganda

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Summary

Due to political instability in many Third World countries doctors in simply equipped rural hospitals are sometimes confronted with war injuries. In those situations sending patients to specialized centres is often impossible.

We studied a series of 100 consecutive patients with missile injuries treated during 1982/3 in an Ugandan mission hospital. Out of these 87 were available for sufficient follow-up, 11 disappeared before completing the treatment, and two died. The results are reported.

It is concluded that many cases of missile injuries, except the most serious thoraco-abdominal lesions and major neurovascular problems, can be managed satisfactorily in rural hospitals with basic facilities only, provided sound surgical principles are observed, particularly wound treatment in two stages.

Introduction

Mengo Hospital is a small Anglican mission hospital in one of the densely populated outskirts of Kampala. During the years of political unrest in Uganda the hospital received many patients with various types of missile wounds caused by submachine guns, rifles, landmines and handgrenades. The majority of the patients arrived 3–24 hours after the injury, some did not reach the hospital until 2–3 days later.

The hospital had a resident surgeon, no blood bank, no running water and no X-ray facilities. X-rays could be taken at a nearby government hospital, only when patients were fit for transport, which usually meant after initial surgery. Anaesthesia (ketamine or ether) was given by Anaesthetic Assistants, paramedical staff trained in practical anaesthesia.

Due to the political situation at the time patients could not be sent to more sophisticated or specialized centres. We studied the outcome of 100 consecutive cases treated in 1982/3.

TABLE I *Distribution of injuries*

Flesh wounds limbs and non-penetrating wounds trunk	39
Fractures and joint injuries (ribs not included)	51
Neurovascular injuries	15
Penetrating abdominal, thoracic and abdomino-thoracic injuries	20
Brain	2

Patients and methods

On arrival all patients received morphine, penicillin, streptomycin and tetanus toxoid. Cases of shock were resuscitated with isotonic saline or Haemaccel® (Hoechst) intravenously. If blood was needed relatives were requested to donate. Table I gives the distribution of the injuries. Many patients had multiple wounds. Thirty two wounds appeared to be caused by high velocity missiles.

In all cases of injuries to the extremities a two stage procedure was carried out. Wound toilet and excision of devitalized tissue were done at arrival, with decompression fasciotomies wherever necessary. Inspection, further debridement if indicated, and delayed primary suture were done at a second stage, 5–6 days later.

Facial wounds were closed immediately.

Fractures were reduced as accurately as possible and treated conservatively. X-rays were only taken to check the position after reduction, if necessary, or to check the rate of healing later. In 7 cases of the most serious open fractures a closed plaster was applied, leaving the wound open as advised by Winnet Orr *(1)*.

We did not attempt any primary nerve repair. In the only case where a major vascular repair would have been indicated, a torn brachial artery, the patient arrived too late to save the arm.

The various surgical procedures done for injuries of the trunk are listed in Table II. We performed laparotomies for all penetrating abdominal injuries.

We usually stopped antibiotics after 7–10 days, except in cases of grossly contaminated open fractures.

TABLE II *Surgical procedures for injuries of the trunk*

Procedures done at laparotomy	
Repair of hollow viscus	7
Repair of liver	1
Repair of mesentery	2
Repair of ovary	1
Exploratory laparotomy (negative or retroperitoneal haematoma only)	5
Procedures done for chest injuries	
Conservative treatment	1
Chest drain	4
Thoractomy (for large defect chest wall)	5
Repair diaphragm and liver	1

Results

In order to get an impression about the outcome of our cases we did a follow-up study of 100 consecutive patients in 1982/3. For various reasons, mostly political, 11 patients disappeared. Two died and 87 were available for sufficient follow-up.

Most of the wounds treated by delayed primary suturing healed (Table III). Failure was either due to inadequate debridement or to too much tension on the edges of the wound.

All facial wounds healed primarily. Laparotomy and thoracotomy wounds often showed a partial dehiscence of the skin, particularly where the original wound had been included in the incision. In these cases it is probably better to leave the skin of the operation wound open *(2)*.

In the group of the fractures we saw 5 cases of delayed union but it should be mentioned that most of our defaulters were in this group (Table IV). The 7 patients treated by Winnet Orr's *(1)* method did well. Their very serious open fractures united at a normal rate with the wounds healing spontaneously in closed plasters. There were no cases of gas gangrene.

Since we had no facilities for secondary nerve repair most of the permanent disabilities occurred in the group of neurovascular injuries.

The two deaths were in the thoracic/abdominal group. One was a 27 year old girl with severe multiple injuries of the small and the large bowel and extensive faecal contamination of the abdominal cavity. She died on the operating table. The other case was a 16 year old girl who died with irreversible shock due to extensive blood loss.

As regards their final condition we classified our patients in four groups (Tables V and VI).

TABLE III *Wound healing*

		Primary healing		
	n	*Complete*	*Partial (more than half)**	*Failed**
Immediate closure	28	11	9	8
Delayed primary suture (DPS)	54	38	12	4
Partial DPS	16	—	13	3
Skin grafts	9	3	5	1

*All residual defects left open to heal by second intention

TABLE IV *Fractures and joint injuries (ribs not included)*

	n	*Delayed union*	*Patient disappeared*
Skull	3		
Spine	1		
Pelvis	7		
Femur	3	1	
Tibia/fibula	3	1	
Foot	3		
Scapula	9		
Clavicle	1		
Humerus	5	2	3
Radius/ulna	6	1	1
Hand	6		2
Knee	1		
Ankle	1		
Shoulder	1		
Hand	1		

TABLE V *Final outcome*

	*Groups of patients**					
	N	*0*	*1*	*2*	*3*	*Died*
Flesh wounds limbs and non-penetrating injuries trunk	39	38	1	0	0	0
Fractures only	28	13	12(5)†	1†	2(1)†	0
Fractures and neurovascular injuries	9	3(1)†	2	2	2	0
Neurovascular injuries only	3	2	0	0	1	0
Abdominal and/or thoracic injuries	12	12	0	0	0	0
Abdominal and/or thoracic injuries with fractured limbs	4	1	0	1†	0	2
Abdominal and/or thoracic injuries with fractured limbs and neurovascular injuries	3	2	1†	0	0	0
Brain injuries	2	1	0	0	1	0

*Groups of patients:
0: back to normal
1: minimal abnormality, not interfering with normal function and/or expected to recover when seen last
2: permanent disability, not interfering with normal social activities
3: serious permanent disability.
†patients disappeared from follow-up.

TABLE VI *Details of disabilities of patients in groups 2 and 3*

Disabilities in group 2 (n=4)
Ulnar nerve paralysis L hand
Partial ulnar nerve paralysis L hand
Amputation index finger
Sinus from back to pubic area, probably due to retained sequestrum fractured pelvis (patient refused surgery)

Disabilities in group 3 (n=6)
Stiff knee after fracture/dislocation
Radial nerve paralysis R hand
Partial sciatic nerve paralysis (R foot)
Stiff R hand after multiple injuries IP joints
Blind L eye and deaf L ear due to intracranial damage
Gangrene R forearm after division brachial artery (patient was arrested by the police before we could amputate).

Discussion

For the satisfactory management of missile injuries with basic facilities only, a correct surgical treatment, usually a two stage procedure, is most important *(3,4)*. Complete excision of all devitalized tissue is essential. In cases caused by high velocity missiles this may imply major surgery but if done correctly the results are good, even in simply equipped operating theatres. Only facial wounds can be closed immediately *(5)*. All others should be closed at a second stage, after further debridement if necessary *(6,7)*.

Primary repair of torn nerves and tendons should not be attempted. For secondary repair sending the patient to a specialized centre will often be necessary. Repair of a major blood vessel could be very difficult under less than ideal circumstances. In rural areas, however, many vascular cases will never reach a hospital in time to save life or limb, due to difficulties of transport.

We felt that in our situation open fractures had to be treated conservatively because of the risk of osteomyelitis *(8)*. Our experience with Winnet Orr's method was good *(1)*. Lack of X-ray facilities should never be an excuse for not treating a fracture as correctly as possible there and then.

We realize that our abdominal and thoracic cases were to a certain extent self-selecting. Due to lack of transport we never saw major vascular injuries of chest or abdomen. Yet we feel that for the treatment of most patients who manage to reach a rural hospital alive, sound surgical principles, particularly in dealing with wounds of various abdominal organs, are more important than sophisticated equipment. In cases of penetrating abdominal injury an emergency laparotomy is always indicated *(9)*, and surgery should not be delayed by having X-rays taken elsewhere to detect possibly retained bullets. Neither should lack of X-ray facilities prevent the surgeon from doing an emergency thoracotomy in cases of large chest wall defects or continuing bleeding. For a minor haemopneumothorax a simple chest drain is sufficient *(10)*.

We feel that in remote rural hospitals and in primitive circumstances many cases of missile injuries, except the most serious abdominal and thoracic cases, and major neurovascular problems, can be treated satisfactorily. X-rays are not often necessary in the acute stage. It is essential, however, to follow sound surgical principles.

I am very grateful to anaesthetic assistants and nurses of Mengo Hospital operating theatres for their support under difficult circumstances.

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READ THIS

Accuracy of Suture Placement
by S Seki
British Journal of Surgery 1987;74;195–7.

Q: Do you jiggle?
A: Only sometimes!

It is exceedingly rare to find an article appearing in a major surgical journal to be totally devoid of references! Dr Seki from Okayama University Medical School, Japan, has achieved this feat by publishing a genuinely original article on a subject that, to the best of my knowledge, has not previously been investigated—namely, the precision with which a surgeon can place a suture.

Three groups of seven surgeons were randomly selected from larger groups with varying amounts of surgical experience. Each surgeon was asked to aim a 29 mm half-circle needle held on a Hegars' needle holder at an exit point 2 cms distant from the point of entry; 22 attempts were allowed. The results were by no means as precise as might be expected. Although the more experienced surgeons scored better than their junior colleagues they achieved this only by 'jiggling' the tip of the needle after entry to achieve an improved accuracy of placement after the suture had started. If no jiggling was allowed the most experienced surgeons achieved only a 33% accuracy aiming at an exit circle 2 mm in diameter. Dr Seki concludes that precise suturing technique requires more formal instruction early in a surgeon's career and regular practice thereafter.

It has often been remarked that it is surprising that at no stage in a surgeon's career is there any formal assessment of craft technique. Perhaps Dr Seki's article will speed the day when a test of surgical technique (using simulated tissues) will be incorporated in the FRCS examination.

B T JACKSON