ICRC surgical activities

by
Dr. Rémi Russbach
Dr. Robin Charles Gray
Dr. Robin Michael Coupland

1. Background

The surgical activities of the International Committee of the Red Cross stem from the institution's general mandate to protect and assist the victims of armed conflict.

The war wounded are thus only one category of the victims included in the ICRC's terms of reference.

The ICRC's main role in relation to the war wounded is not to treat them, for this is primarily the responsibility of the governments involved in the conflict and hence their army medical services. The task of the ICRC is first and foremost to ensure that the belligerents are familiar with the provisions of the Geneva Conventions and apply them, that is, care for members of the enemy armed forces as well as their own and afford medical establishments and personnel the protection to which they are entitled.

Nevertheless, local medical services are often completely overwhelmed in conflict situations and the ICRC is then compelled to step in to help the war wounded. When supplying hospitals with medical equipment and medicines is not enough, the ICRC has to set up its own surgical facilities to offer the wounded the care that the authorities cannot provide.

There was a sharp increase in conflict situations calling for direct ICRC assistance in the 1980s and the institution's surgical activities showed an unprecedented expansion. The number of wounded admitted to ICRC hospitals rose from 4,000 in 1987 to 18,450 in 1990. By the beginning of 1991 the ICRC was running 14 surgical establishments in eight countries, staffed by 22 surgical teams.

These various surgical units have developed along different lines, depending on the constraints imposed by the local context.

In Thailand, Pakistan, Afghanistan, Kenya and Somalia, the ICRC surgical hospitals are entirely autonomous. They are housed in ICRC premises and are staffed by expatriate personnel, backed up by local employees who work under ICRC supervision.

In such cases the ICRC has complete control over the system of treatment and can compile reliable statistics.

In other countries (Cambodia, Ethiopia), the ICRC's teams have to work in government-run hospitals and are limited to performing surgery, while the government retains responsibility for other services and for most of the nursing staff.

The ICRC has to ensure that in hospitals not under its control certain basic principles are respected so as to win the trust of the adverse party (no weapons or political activity in the hospital, no discrimination against enemy wounded). A recent example is the government hospital in Bahr Dar, where the ICRC was working under an agreement with the Ethiopian authorities incorporating those principles. When rebel forces overran the town they spared the hospital and let the ICRC team go on with its work in accordance with the same principles.

ICRC surgical hospitals differ considerably from army medical units in that the ICRC has no control over the system to evacuate the wounded and has no referral facilities. Each ICRC hospital therefore serves as both first-aid and final referral centre, thus forming an entity that has little in common with a military surgical unit.

The ICRC does, however, try to extend its activities to the prehospitalization phase and to organize adequate first-aid and transport.

It is not usually possible for ICRC staff to have access to the actual scene of the fighting, so arrangements for the prehospitalization phase have to be made through intermediaries.

With this in mind, the ICRC has set up several programmes to train first-aid workers belonging to groups involved in the fighting. The basic first-aid training given (dressing wounds, immobilizing fractures, stopping bleeding, rehydration, administration of antibiotics) is accompanied by an introduction to the elementary principles of international humanitarian law (ban on killing wounded enemies and prisoners, respect for civilians, etc.).

2. Organization

ICRC hospitals are designed to receive a large number of casualties at the same time. In the admissions area the patients undergo triage and resuscitation and are prepared for theatre. The patient's condition determines whether he or she requires haemoglobin estimation, cross-matching or radiography.

A blood bank is important when managing major injuries. In the situations in which the ICRC is working, blood for transfusion is often scarce. Donation of blood is encouraged among the local population and the patients' relatives; collection sessions are used as opportunities to disseminate the basic principles of the Red Cross and Red Crescent.

There may be cultural and practical obstacles to the collection of blood, and often widespread chronic anaemia in the local population is a further complication. Judicious use of the available blood is therefore essential. The general guideline is not to transfuse patients with a haemoglobin level above 7 g/dL. Before transfusion, each unit of blood is cross-matched and tested for malaria, syphilis, hepatitis B and HIV. The quantity of blood needed for war surgery has been established from experience; the average requirement in ICRC hospitals is 45 units per 100 patients admitted; this rises to 60 units if the patients are admitted within six hours of being wounded and to 100 if antipersonnel mines are widely used in the conflict concerned.

The radiographic service is limited to plain films, which are sufficient for preoperative assessment.

In an ICRC hospital, the operating theatre, postoperative ward, blood bank, laboratory and radiography unit are housed in permanent structures (brick, corrugated iron) with a concrete floor. The surgical wards and triage areas may be simple shelters or tents if the security situation permits. Thus bed capacity can be increased easily and rapidly.

The surgical equipment, drugs and nursing materials used are standardized. The standard list, drawn up by the ICRC Medical Division, ensures uniform management throughout the institution's hospitals; it avoids problems arising from different expectations and preferences on the part of medical personnel. This is particularly important in situations where the surgical teams rotate on a three-month basis. The standard list is regularly reviewed. The principle on which it is based is to provide only items essential for managing war wounds, such as basic instrument sets and equipment for safe anaesthesia.

The ICRC hospitals also provide a physiotherapy service, outpatient review and, later, rehabilitation. The hospitals are run by both expatriate and local staff. The medical personnel are recruited through National Red Cross and Red Crescent Societies; each surgical team consists of a surgeon, an anaesthetist and an operating theatre nurse.

3. Triage

The capacity to deal with a large number of patients admitted within a short period may be limited by the operative facilities. In such circumstances it is necessary to determine which patients have high priority for treatment. The triage officer should preferably be an experienced doctor; it can be difficult to come to terms with the concept that the most severely wounded may not have top priority. Category I comprises those who need urgent surgery but who have a good chance of survival. Category II includes both patients who do not require surgery for their wounds and those who are so severely wounded that surgery would not help and would take up excessive surgical resources. Category III comprises those who can safely await surgery. Frequent reassessment is necessary, as inevitably some patients with hopeless prognoses improve while others may deteriorate. Rational triage is of paramount importance to achieve "the best for the most".

4. Wound management

Wounds from fragments or bullets may be small, requiring little or no surgery. Those with significant tissue damage, however, are usually heavily contaminated and pieces of clothing or skin are pushed or sucked into the wound. With mine injuries, the victim may suffer traumatic leg amputation while stones, mud and bone fragments are blown up into the thighs, buttocks or genitals.

The surgical aims are to remove all the foreign materials and loose bone fragments, to excise the devitalized tissue and to decompress the viable tissue that remains. The wounds are then left open and dressed with sufficient quantities of loose gauze to absorb the blood and serum exudate. The dressing remains undisturbed until the date for delayed primary closure (four to five days), unless the general condition of the patient indicates that the wound has been incompletely excised. Delayed closure may be by direct suture, skin graft or reconstruction. For limb wounds, correct wound management has a higher priority

than the method of fracture fixation; external skeletal fixation has proved popular with surgeons but there is growing recognition of the efficacy of simpler means such as plaster of Paris.

5. Training of civilian surgeons for war surgery

The ICRC Medical Division recognizes that the transition from specialized civilian surgical practice to the management of war wounds may be difficult for many surgeons. They are faced with different working conditions, equipment, pathology and patient expectations. Moreover, they are working outside the speciality for which they have been trained.

A course for surgeons is held every year and has proved a popular forum for exchanging information and experience. Surgical briefing material has been distributed to all National Red Cross and Red Crescent Societies that recruit surgeons. There have been many publications documenting the ICRC's experience in war surgery *(see below)*, the aim of which is to establish a process of internal evaluation to improve professional performance. Such publications are proving a valuable means of contact between the Medical Division and professional bodies, National Red Cross and Red Crescent Societies and armed forces medical services which could benefit from ICRC experience.

In addition, there is growing recognition that the experience gained by individual surgeons on ICRC missions is beneficial to their civilian practice and, in the case of younger surgeons, it is an asset for their curriculum vitae. Indeed, in modern surgical training there is little opportunity to experience true general surgery; the ICRC provides that opportunity.

6. Conclusion

The ICRC Medical Division, while continuing to expand its surgical activities, is at the same time endeavouring to retrieve this field experience for the benefit of others who have to manage war-wounded patients.

Dr. Rémi Russbach
Dr. Robin Charles Gray
Dr. Robin Michael Coupland

SHORT BIBLIOGRAPHY ON WAR SURGERY

- Kjaergaard J., "Les blessés de guerre de l'hôpital de campagne du CICR à Beyrouth en 1976", *Schweizerische Zeitschrift für Militär- und Katastrophenmedizin*, 1978, Vol. 55, No. 1, pp. 1-23.
- Bion J., "An anaesthetist in a camp for Cambodian refugees", *Anaesthesia*, 1983, No. 38, pp. 798-801.
- Morris D.S., Sugrue W.J., McKenzie E., "On the border of Afghanistan with the International Committee of the Red Cross", *New Zealand Medical Journal*, 1985, No. 98, pp. 750-752.
- Frei E., "Schuss- und Splitterverletzungen. Wundballistisches Einmaleins", *Médecine militaire*, 1986, No. 1, pp. 5-14.
- Graber P., Rochat C.-H., "Les lambeaux musculo-cutanés et musculaires en chirurgie de guerre", *Médecine militaire*, 1986, No. 1, pp. 16-19.
- Gertsch P., "Lésions vasculaires des blessés de guerre afghans traités à l'hôpital du CICR à Peshawar", *Médecine militaire*, 1986, No. 2, pp. 46-47.
- Rochat C.-H., Graber P., Ursprung T., "Traitement des plaies par projectiles en condition de guerre (Afghanistan). Suture primaire différée ou suture secondaire?", *Médecine militaire*, 1986, No. 1, pp. 20-22.
- Gertsch P., Savolainen H., Christensen P., "Traumatismes thoraciques en temps de guerre. Evaluation et planification hospitalière", *Médecine militaire*, 1986, No. 4, pp. 95-97.
- Verbeke J. H., "Initial treatment of war casualties in a field hospital", *Acta Anaestesiologica Belgica*, 1987, No. 38, pp. 261-265.
- Trouwborst A., Weber B.R., Dufour D., "Medical statistics of battlefield casualties", *Injury*, 1987, pp. 96-99.
- Gertsch P., "Assessment of hospital workload in war surgery", *British Journal of Surgery*, September 1987, Vol. 74, pp. 831-833.
- Frei E., "Wundinfekte im Krieg", *Médecine militaire*", 1987, No. 4, pp. 121-123.
- Coupland R.M., Howell P., "An experience of war surgery and wounds presenting after 3 days on the border of Afghanistan", *Injury*, 1988, No. 19, pp. 259-262.

- Gray R.C., Winiger E., *War surgery: an introduction*, ICRC Audio-visual Division, Geneva, 1988.
- Dufour D., Kroman Jensen S., Owen-Smith M., Salmela J., Stening G.F., Zetterström B., *Surgery for victims of war*, International Committee of the Red Cross, Geneva, 1988.
- Rautio J., Paavolainen P., "Afghan war wounded: Experience with 200 cases", *Journal of Trauma*, 1988, Vol. 28, No. 4, pp. 523-525.
- Coupland R.M., "Technical aspects of war wound excision", *British Journal of Surgery*, 1989, No. 76, pp. 663-667.
- Coupland R.M., "Amputation for antipersonnel mine injuries of the leg: preservation of the tibial stump using a medial gastrocnemius myoplasty", *Annals of the Royal College of Surgeons of England*, No. 73, pp. 21-25.
- Coupland R.M., "A management algorithm for chronically exposed war wounds of bone", *Injury*, 1990, No. 21, pp. 101-103.
- Coupland R.M., "The role of reconstructive surgery in the management of war wounds", *Annals of the Royal College of Surgeons of England*, 1991, No. 73, pp. 21-25.
- Coupland R.M., *The Red Cross wound classification*, International Committee of the Red Cross, Geneva, 1991.
- Strada G., Coupland R.M., Gray R.C., "Surgery for victims of war: the experience of the International Committee of the Red Cross", *The Journal of Emergency Surgery*, 1991, No. 14 (2), pp. 126-130.
- Gray R.C., "Surgery for war and disaster", *Tropical Doctor*, 1991, No. 21, supplement 1, pp. 56-60.
- Pesonen P., "Pulse oximetry during Ketamine anaesthesia in war conditions", *Canadian Journal of Anaesthesia*, 1991, vol. 38, No. 5, pp. 592-594.
- Eshaya-Chauvin B., Coupland R.M., "Transfusion requirements for the management of war injured: the experience of the International Committee of the Red Cross", *British Journal of Anaesthesia*, 1991 *(in press)*.
- Coupland R.M., Pesonen P., "Craniocerebral war wounds: non-specialist management", *Injury*, 1991, No. 6 *(in press)*.
- Morris D.S., Sugrue W.J., "Abdominal injuries from the war wounded of Afghanistan: a report from the International Committee of the Red Cross Hospital in Kabul", *British Journal of Surgery*, 1991 *(in press)*.

- Morris D.S., "Surgeons and the International Committee of the Red Cross", *Australian and New Zealand Journal of Surgery*, 1991 *(in press)*.
- Coupland R.M., Korver A., "Antipersonnel mine injuries: the experience of the International Committee of the Red Cross", *British Medical Journal*, 1991 *(in press)*.
- Coupland R.M., "The Red Cross classification of war wounds", *World Journal of Surgery*, 1992, Vol. 16, No. 3 *(in press)*.

Dr. Robin Charles Gray was born in 1942 in Epsom, England. He studied medicine in Great Britain, receiving an M.A. in 1966 and becoming a Fellow of the Royal College of Surgeons in 1972. In 1979, he obtained a Certificate of Higher Surgical Training in general surgery. He has been a surgical tutor for the Royal College of Surgeons, Chairman of the Department of Surgery at Brook General Hospital, Consultant in General and Urological Surgery at Gama Hospital in Riyadh, Saudi Arabia and Consultant General Surgeon for the South-East Thames Regional Health Authority. His first secondment to the ICRC by the British Red Cross in 1983 was followed by many others for missions to ICRC surgical hospitals in Thailand and Pakistan. He has been an ICRC medical co-ordinator since 1988 and in 1989 was made the institution's Co-ordinator for War Surgery.

Dr. Robin Michael Coupland was born in 1957 and studied medicine in Great Britain. He received his M.A. in 1982 and became a Fellow of the Royal College of Surgeons in 1985. From 1985 to 1987 he worked as Registrar for general gastro-intestinal, urological and cardio-thoracic surgery at the University College Hospital and Middlesex Hospital. He was then seconded by the British Red Cross for several missions to ICRC surgical hospitals in Pakistan (Peshawar and Quetta), Thailand (Khao-I-Dang) and Angola. He has been a surgical co-ordinator at the ICRC since November 1989.

Thirteen years' experience in fitting war amputees with artificial limbs

by Alain Garachon

From its very beginnings the ICRC has been concerned with the war disabled and has done what it can to help them. After the Second World War it was involved in orthopaedic activities in various countries, such as Finland, Viet Nam, Jordan, Hungary, Algeria, Morocco, Israel, Egypt, Nigeria, Somalia and Yemen.

At the time such work was carried out by specialized firms using the technology of industrialized countries, but during the 70s the ICRC and WHO set up an orthopaedic programme in Yemen based on the local manufacture of orthopaedic components, to avoid having to rely on imports.

This policy, which was widely adopted by international cooperation agencies and even laid down as a principle under the general heading of "appropriate technology", led some experts to go to the other extreme of advocating techniques too remote from the basic requirements of the profession, although they appeared quantitatively more attractive in satisfying an ever-growing demand.

Over the past thirteen years, the ICRC has established 24 orthopaedic workshops in 14 countries. They have produced:

- prostheses 37,000
- orthotic appliances 11,000
- wheelchairs 3,400
- pairs of elbow crutches 68,000

Fifty-three expatriate associates, mainly prosthetists, were engaged in this work in 1990, together with some 300 local assistants.

In all programmes of this type, the ICRC endeavours to develop techniques and components appropriate to the economic capacity of the countries concerned, and has succeeded in designing and producing artificial feet and knees using local materials.

In many countries, however, basic raw materials such as wood and leather are becoming ever scarcer and more expensive. In Angola, for example, suitable wood costs US$ 3,000 per cubic metre.

This situation has recently led the ICRC to employ cheap synthetic materials, such as polypropylene, along with local materials, of course, whenever these are available at a reasonable price.

In certain countries with many amputees (for example Viet Nam, whose authorities cite the figure of 60,000), machine tools of simple design have been developed for the mass production of artificial knees. This has the additional advantage of ensuring a degree of standardization in the quality of the finished product.

In a case such as Viet Nam, if one takes a figure of only 40,000 amputees and an annual production of 10,000 artificial limbs, each with an estimated life of four years, it would take four years to fit all the amputees and production would have to continue at the same rate. At least 200 prosthetists would be needed to maintain such an annual output!

Even in Angola or Afghanistan, where its output is highest (about 1,500 prostheses annually in each country), the ICRC is far from achieving such figures.

The other aspect of ICRC work in this sphere is *the training of local prosthetists*. The training courses comply as far as possible with the recommendations of the International Society for Prosthetics and Orthotics (ISPO), which has established various levels of training for developing countries. In general, trainees are prepared for level II, a three-year course. Level I is more or less equivalent to the training given in European countries.

Training programmes are carried out in close cooperation with the Ministries of Health concerned. Where this is not already the case, the latter are encouraged to give official recognition to the profession of prosthetist/orthotist to assure the future and further training of new graduates. Practical and theoretical courses are conducted by expatriate prosthetists and physiotherapists and also by local technical teachers and doctors. The final examinations are supervised by the teachers who run the courses and a representative from the ISPO. Appropriate training is also given to assistant prosthetists and craftsmen specializing in the manufacture of components.

The purpose of these programmes, apart from fitting as many amputees as possible, is to make the workshops technically and administratively independent so that the ICRC can eventually phase out its involvement.

Experience over the past twelve years has shown that good expatriate professionals are capable not only of fitting patients but also of manufacturing components and teaching, thus enabling their local counterparts to achieve a satisfactory level of technical independence. The same cannot be said, however, of administrative independence, over which the ICRC has no control after the hand-over.

Indeed, factors such as political will, operational budgets, administrative competence and working conditions are vital to the success or failure of a programme, irrespective of the technical level of the staff.

Many countries have insufficient resources to ensure a regular supply of local and imported materials and to pay their employees a decent salary. The latter are then compelled to take a second job in order to survive, or they leave the workshops.

The ICRC is now concentrating on these "administrative" aspects, in order to preserve programmes which took so much time and effort to implement.

Not all countries are prey to such difficulties, however, and very satisfactory results have been achieved in some of them: Yemen, Pakistan, Zimbabwe, Chad and Burma. Elsewhere, in Angola, Mozambique, Nicaragua, Ethiopia, Sudan, Uganda and Lebanon, despite the sound technical level of the staff, the ICRC has to maintain a presence in order to compensate for the administrative shortcomings of its partners.

In Viet Nam and Afghanistan, where programmes have been set up more recently, the ICRC's local counterparts have not yet reached the stage of technical self-sufficiency. It is regrettable in this connection to note that international cooperation agencies are interested first and foremost in the technical aspects of orthopaedic activities. Without underrating the importance of this, we feel that it is essential to attach equal importance, if not top priority, to ways of integrating such programmes into local structures so that long-term success is assured.

Alain Garachon

Mr. Alain Garachon, who was born in Paris in 1942, obtained a degree in physiotherapy in France in 1964 and practised physiotherapy in Paris between 1967 and 1975. He was seconded by the French Red Cross to work for the ICRC in Biafra, Bangladesh and Lebanon (1969, 1972, 1977) and was also employed in a spastic children's centre in Melbourne (1976). Since 1978 he has been in charge of the War Disabled Rehabilitation Service within the ICRC Medical Division.