The road accident after-care scheme symposium

THE North Riding of Yorkshire Road Accident After-care Scheme held a symposium on 10–11 May 1969 at Scotch Corner Hotel, Yorkshire, with the support of Messrs Geigy Ltd. It was attended by 230 delegates from all over the world.

The chairman of the first session, Mr Gilbert Parker, said he considered Scotch Corner to be a most appropriate place to hold such a meeting as it had been a road junction since Roman times and ‘accidents’ occurred to travellers even at that time.

Head injuries

Dr Simon Sevitt, pathologist at Birmingham Accident Hospital discussed “Causes of death from head injury.” He pointed out that 24 per cent of deaths from trauma on the roads are caused by head injuries alone and that 63 per cent of all fatal traffic accidents have a head injury; multiple trauma commonly occurs.

In recent closed cerebral trauma, the pathological changes in terms of anatomy are limited. There are primary lesions in vital centres, consisting primarily of brain-stem contusion and third ventricle contusion. Secondary lesions offer the greatest possibility of prevention by adequate treatment, and the most outstanding of these complications is tentorial herniation. This results from a rise of pressure in the ‘brain-box’ above the tentorium forcing part of the brain through the opening in the tentorium resulting in distortion by pressure.

The third nerve stretches at an early stage in this process causing dilatation of the pupil, and subsequent distortion of the mid-brain ultimately results in decerebrate rigidity.

Ponto-mid-brain haemorrhage results in hyperpyrexia and death from cardiac and respiratory arrest or prolonged unconsciousness. Interference with blood supply by pressure results in infarction of the temporo-occipital lobe.

Tentorial herniation may be caused by extradural haemorrhage resulting, for example, from a torn middle meningeal artery, after a trivial head injury, or subdural haemorrhage resulting from a cerebral laceration or torn pial veins, particularly in the parasagittal or parietal areas. Haemorrhage may occur from the under surface of the cerebral hemispheres, the location depending on the direction of the blow, but most commonly in the frontal or temporal regions.

When tentorial herniation occurs the parahippocampal gyrus and uncus press against the edge of the tentorium cerebelli and a tell-tale groove is found post mortem.

One of the most important complications of head injury is inhalation of blood or vomit during unconsciousness causing asphyxia or pulmonary oedema.

Dr Sevitt concluded by quoting figures which showed that of 250 fatal road accidents 157 died from head injury. In 59 of these cases brain-stem contusion was the cause of death and occurred most commonly in the first 24 hours. In 53 cases tentorial herniation was the cause of death and this occurred most commonly during the first week after the first 24 hours.

Professor John Gillingham from Edinburgh, discussed the “Resuscitation and management of acute head injuries”. He pointed out that primary brain-stem lesions may be completely reversible, quoting the case of a dog knocked down by a motor car,
which had decerebrate rigidity for a few minutes afterwards and then got up and ran away. We are still uncertain of the living dynamic pathology of many head injuries. Hope for survival may depend on prompt and adequate care, but 50 per cent of cases of extra-dural haemorrhage are still fatal, in spite of the relatively simple technique of evacuating the haematoma through a burr-hole.

Consciousness may not be lost in static head injury (as when a child's head is run over by a vehicle) but with acceleration or deceleration injuries (as in a knock-out punch or motor-cycle crash) movement of the brain within the skull results in brain contusions in the anterior part of the skull. When the brain moves forward in this way the blood supply is cut off from parts of the mid-brain. In severe injury infarction of the areas supplied by the striate vessels may occur.

The Edinburgh School consider that immediate tentorial herniation may occur at the moment of injury. Inhalation of vomit may result in raised blood-pressure due to anoxia and this may cause further haemorrhage into the damaged mid-brain.

In the first-aid management of head injuries the most urgent necessity is to maintain an adequate airway. The patient should be placed in the semi-prone position with the tongue hanging forward. This position is still often not used by lay people and ambulance men.

Many people are not in normal health before the accident and therefore proper history-taking is vital and the communication of information from ambulance men and others is essential.

Angiography, ultrasonic encephalograms, and automatic patient monitoring all form part of the modern management and investigation of head injury in hospital.

With the increasing speed of traffic, there has been a steady increase in the number of head injuries admitted to hospital. Few patients in Edinburgh are seen by a general practitioner first, and most accidents occur in summer and at New Year, as Edinburgh is a holiday city. Friday night and Saturday are the busiest days of the week and more head injuries occur in the evenings at drinking time.

The introduction of the breathalizer resulted in a reduction in the combination of head injury and alcoholism in drivers but an increase in the combination in pedestrians. The most commonly affected age group is 16–25. Only two per cent of patients with head injury develop complications.

Professor Gillingham concluded by saying that it is 25 years since a well-developed accident team was established in war-time and that the establishment of a well-organized accident team in peace-time was long overdue and depended upon how much we could afford.

Chest injuries

Mr E. Hoffman, a surgeon from Teesside, discussed the "Resuscitation and management of acute chest injuries." In one study 48 per cent of road accident deaths were caused by chest injuries and they commonly occur combined with other injuries. Open injuries are rare. The commonest chest injury is damage to a rib or ribs and complications may include injury to an intercostal artery, ruptured spleen, ruptured liver or ruptured diaphragm.

In crush injuries, several ribs may be fractured resulting in a mobile portion of chest wall, moving paradoxically on respiration. Lung compression may result from pneumothorax or haemothorax. A tension pneumothorax produces severe dyspnoea.

Contusion or laceration of lungs may occur, and it is important to recognize damage to the great vessels as surgical repair is now feasible. Contusion of the heart often
accompanies a fractured sternum. The ECG shows similar but less marked changes to those occurring in coronary thrombosis.

In minor injuries the patient can clear his airway and his breathing; in moderate injuries he is breathing but cannot clear his own airway; in severe injuries he cannot breathe and cannot clear his airway.

First aid measures consist of:

1. Clear the airway. This is best done by tilting the head back, clearing the mouth and throat and inserting a salad airway.

2. Artificial respiration. Mouth-to-mouth respiration should be done first. A bag and mask should be used if available, and an endotracheal tube inserted as soon as possible (this should be done by trained doctors only).

3. Restore the circulation. First, feel for the carotid pulse; if absent start immediate external cardiac massage. In some cases ventricular defibrillation or open cardiac massage may be necessary.

If there is a tension pneumothorax a needle should be inserted with underwater drainage. A large pad placed over a flail segment of chest wall often stabilizes it and brings relief.

The best analgesic for emergency use is intravenous pethidine given 10 mg at a time until relief is obtained, and is especially useful if pain is preventing proper ventilation. Morphia should not be given because of its depressant effect on the respiratory centre.

Inhalation of vomit or blood occurs in a high proportion of fatal accidents. In a recent survey of 127 cases brought into a Teesside casualty department, 46 were lying flat on their backs while being transported.

It should be remembered that elderly patients and those with pre-existing chronic bronchitis may develop respiratory failure from a very small chest injury.

Mr Hoffman concluded by saying that it is essential to improve treatment at the site of the accident, during transport and during the first few hours afterwards.

**Spinal injuries**

Mr D. K. Evans, orthopaedic surgeon at the Spinal Injuries Centre at Sheffield discussed "The management of acute spinal injuries." Compared with head and chest injuries, spinal injuries are rather unusual in road accidents. However, in recent years with the increasing speed of traffic there has been an increase in the number of cervical injuries and in the number of paraplegias and quadriplegias.

A common injury is the wedge fracture of a vertebral body; in this injury the spines remain firmly attached to each other so that the spine is stable and neurological damage is rare. Another injury is the verticle compression fracture or 'burst' fracture which occurs in the cervical or lumbar region. This is stable but very painful and damage to the cord often occurs.

Twisting injuries result in rupture of the posterior ligaments giving simple dislocation in the neck or fracture-dislocation in other parts of the spine. This type of injury usually causes damage to the cord.

Shear fractures, in which one vertebra shears forward on another, occur usually in the thoracic spine.

Extension injury of the cervical spine results in a 'tear-drop' fracture of a vertebral body; diagnosis is not easy except by x-ray. A palpable gap between two spinous processes is the vital sign of instability of the spine as it indicates injury to the interspinous ligaments.

A patient with a neck injury should be transported with light traction in a neutral
position. A patient with an injury to the trunk should be transported with the shoulders and pelvis in line.

It is important to remember that anaesthesia of lower limbs occurs in paraplegia so that it is important to prevent skin damage by turning the patient every two hours.

Rehabilitation may take six months, but this may be extended to 12 months if bed sores have been allowed to develop.

**Soft tissue injuries**

Mr P. S. London, surgeon at Birmingham Accident Hospital, discussed “The management of injuries to soft tissues.” Injuries to skin and mucous membranes require a simple first aid dressing and then primary surgical closure. Large foreign bodies are frequently hidden deep to quite small wounds, especially in modern high speed accidents.

An important injury to recognize is caused by crushing of a limb leading to gross swelling and blistering of the skin; in these cases urgent incision and drainage is required.

In injuries to muscles, tourniquets are dangerous and should not be used. Surgical treatment consists of removal of damaged muscle in order to prevent serious scarring. A muscle can still function adequately even when a major portion of it has been removed.

With subfascial haematoma, there is a danger of Volkmann’s ischaemic contracture occurring and urgent decompression is needed.

Mr London advocated primary repair of tendons and ligaments in most cases.

In the case of vascular damage, once the clinical diagnosis has been made the vessel must be explored and the injury defined. Repair or clearing out of an artery can now be accomplished.

Mr London defended the use of inflatable polythene splints although Ashton has shown that the blood flow through a normal limb may be reduced to one sixth. He also emphasized the value of clinical examination, for example in fractured ribs where fractures frequently do not show on X-ray.

An important sign is the imprint of clothing patterns on bruised skin, as this indicates that the skin has been squashed against bone: if any viscera lie between they are likely to have been damaged and laparotomy is indicated.

It is important not to underestimate the degree of blood loss, and transfusion must be given early to prevent the onset of shock. Twenty-five per cent of the blood volume is usually regarded as a dangerous degree of blood loss.

*The discussion* centred round a number of topics including the best choice of analgesic to use at the road-side. It seemed generally agreed that the best drug for this purpose is pethidine given intravenously and that the biggest danger is the unrewarded administration of any drug.

**The organization of accident services**

*Morning session—Sunday 11 May 1969*

Mr N. Capener, chairman of the Medical Commission on Accident Prevention, was the chairman of this session. In his opening remarks he said, “accidents are rarely simple and never pure”, and quoted Ecclsiastes, “There is a time when there is in their hands good success: at the beginning,” and T. S. Eliot: “My end is at my beginning.” All these quotations apply extremely well to the after care of road accidents.

Oberarzt Dozent Eberhard Gogler, a surgeon from Heidelberg described the organization of the Heidelberg scheme.

In almost all cases the emergency call comes from a layman who contacts the Heidelberg police station where a controller simultaneously calls a police patrol car, a
surgeon in his car, a red cross ambulance, and a student on a motor bike. The surgeon’s car is fitted with a siren, a two-way radio telephone and a flashing light. The surgeon is on call for a week at a time and has a call system with him at all times. The scheme is limited to the Heidelberg urban area.

Conventional ambulances were found to be useless and a special vehicle had to be planned. Ninety per cent of calls are to one patient but 20 per cent of these require supervision during transport. Thus a single stretcher ambulance equipped with resuscitation apparatus and sufficient head room for the surgeon to stand upright is required. It was suggested that one accident ambulance to two ordinary ambulances was the best ratio for urban areas.

The plan of action is as follows:

1. The laymen at the accident site must be prepared to perform mouth-to-mouth respiration and external cardiac massage.
2. The medical management consists of:
   (i) clear the airway
   (ii) start artificial respiration
   (iii) treat for shock
   (iv) cardiac massage
   (v) haemostasis
   (vi) elimination of poisons if necessary
   (vii) general first-aid measures, including sterile bandaging, splints, analgesics, etc.

Inflatable splints have proved of great value in Heidelberg.

During transport particular attention must be paid to the position of the unconscious patient. Haemostat clamps have proved useless in first aid; they are far inferior to firm pressure bandaging.

MR L. W. PLEWES and MR J. HINDLE described the Luton and Dunstable scheme, in which they re-organized a casualty department into an Accident Service.

The service covers a quarter of a million people and the object is to transport the patient as rapidly as possible to the unit; the surgeon does not travel to the site of the accident.

The department accommodates up to 20 seriously-ill patients with multiple injuries. An x-ray diagnostic unit is in the department. Efficient reception and secretarial help is vital. All the resuscitation resources of the hospital are concentrated in the accident unit so that cases of illness requiring resuscitation e.g. coronary thrombosis are dealt with as well as accidents. Special trolleys are used so that the patient is transported, x-rayed, operated on, and recovers, without being moved off the trolley.

An important aspect of this scheme is the need for adequate training of ambulance personnel in more sophisticated techniques, and to this end the ambulance men are brought into the accident department for training, on a day release basis.

When a doctor does travel to the scene of an accident he is usually an anaesthetist who is considered to be the best versed in resuscitation technique.

MR GOLDING, chief fire officer in the Road Accident After-care Scheme discussed the rôle of the fire brigade. A special long wheelbase Land Rover has been developed as a rescue vehicle as ordinary fire engines and ambulances were quite unable to deal with the problems arising from high-speed crashes on modern motor-ways. He discussed the delay which may arise when heavy vehicles such as road tankers overturn, as it may be many hours before suitable lifting equipment can be obtained.

Other members of the fire and ambulance service discussed training methods of personnel and mentioned the need for close co-operation between police, fire brigade, ambulance men and casualty officers in dealing with road accidents. They emphasized
the need for simple apparatus such as a cervical collar and a spinal board to enable trapped victims with suspected spinal injuries to be freed and moved without further injury.

There was a lively *discussion* in which the pros and cons of a combined fire and ambulance service and separate fire and ambulance services were considered.

It was suggested that first aid should be taught in schools and that this should not be restricted to simple bandaging or nursing techniques.

Several speakers advocated the use of large doses of intravenous hydrocortisone in shock at an early stage but it was agreed that this did not obviate the need for urgent fluid replacement in a shocked patient. It was agreed that urgent intubation was more valuable than the now old-fashioned cricoid puncture.

*Afternoon session—Sunday 11 May*

The chairman, Sir Clement Price Thomas, said that he hoped this meeting would stir the public conscience about what is now a major epidemic disease. 70,000 people were killed on the roads during the ten years from 1959.

*Mr N. Capener,* an orthopaedic surgeon and a member of the Council of the Royal College of Surgeons discussed the administrative considerations for improved accident services. He said that a quasi-military operation is needed to cope with the problem of road accidents, and that to plan this their epidemiology must be studied.

Accidents must be prevented as far as possible by improving the standard of driving: Mr Capener considered the present driving test to be inadequate. Lay people must be taught modern first-aid techniques as they are often the only people on the scene of the accident at the time that the emergency resuscitation is needed. Doctors must have improved training in first aid and must be prepared to teach first aid to others. On-the-spot treatment must be organized rather like the advanced surgical units in World War II. A central organization and administration is needed in each area.

The passing of the Civil Defence Organization has resulted in the loss of an already existing organization which could easily be mobilized in emergency. All the interested lay organizations, including Scouts, Guides, Red Cross, St John Ambulance and the Duke of Edinburgh Award Scheme, should all be used to assist public organizations. Regional schools of training for ambulance men should be set up and these should be associated with casualty departments.

Special attention needs to be paid to the design of ambulances along the lines already discussed. Other vehicles, such as helicopters, should be used more often.

Communications are still very poor, considering that in 1969 we can communicate with space men attempting lunar landings.

The greatest need is for integration and organization of existing services.

*Dr K. C. Easton* described the Road Accident After-care Scheme as it has been organized in the North Riding of Yorkshire.

It covers 1,000 square miles of sparsely populated countryside, through which run several major roads, notably the A1 from Boroughbridge to Scotch Corner and several other major roads radiating from Northallerton.

The central police radio control alerts a police car, an ambulance and a doctor simultaneously, and the fire tender is called if likely to be required. Twelve doctors in the area are ‘on call’ and the nearest doctor is summoned. All accidents are dealt with although road accidents are the commonest in this area. The local clergy have agreed
to co-operate and organize a welfare service for survivors of serious accidents, offering immediate hospitality.

The scheme has been in action for 16 months and the general practitioners do not find the extra duties burdensome. The doctors’ equipment is carried in wooden boxes made by the boys of a local approved school and the equipment for each doctor cost about £70.

Dr Easton felt that the North Riding had shown how it could be done and that it was feasible for it to be organized in a similar way on a national scale.

POLICE SUPERINTENDENT FIELD discussed the rôle of the police. About 10,000 accidents per year occur in the area and about 3,000 of these require an ambulance. Only in about 300–400 cases is the fire service needed. The first duty is to protect the scene of the accident and it is a reflection on the standard of driving in this country that they now begin placing cones and warning signs 900 yards away!

Although the scheme covers a particular area on the map, no attention is paid to boundary lines. Supt. Field agreed that the present scheme was not perfect; people still die because policemen, ambulance men, firemen, and doctors, all lack equipment and training.

Other members of the R.A.A.C. scheme discussed the organization of the casualty departments in the area, principally at Darlington and Northallerton where there are two centres in new buildings.

Although the general practitioner is called at the same time as the ambulance, he usually arrived first, because the ambulance depots are situated further away from the main motorways. If the ambulance arrives first the ambulance men do not delay until the doctor arrives but carry on with first-aid measures and urgent removal to hospital. All vehicles are equipped with a simple collar and a spinal board together with inflatable splints, so that an unconscious patient can be immobilized before being extricated from a damaged vehicle. Most commercially available dressings are far too small for the types of injuries found in road accidents and special large dressings had to be made. Plasma expanders (Macrodex) are used for intravenous therapy in the treatment of shock.

A training programme for ambulance men has been instituted and involves visits to the casualty departments for practical teaching.

The doctors in the scheme are volunteers and receive no payment. Their equipment was exhibited in an adjacent room. No attempt is made to provide definitive treatment at the roadside, the objects being to enable the patient to get to hospital as quickly and safely as possible.

So far there have been 351 accidents attended. Of these 192 were attended by doctors. There were 182 seriously-injured patients and 310 slightly injured. In only 16 cases did the ambulance leave before the doctor arrived. The average turn-out time was 16 minutes for the ambulance and 9.7 minutes for the doctors.

DR E. V. KUENSSBERG spoke about the place of the general practitioner in initial care and rehabilitation of injured. He is particularly concerned with the patient as an individual and also with his long term problems. His advice must start with prevention and includes advice to patients whose diseases place them at special risk of accident, e.g. those with heart disease, other cardiovascular disease or those using certain eye drops.

Over 4,000,000 prescriptions are issued for antidepressant drugs annually, and over 15,000,000 prescriptions for phenothiazines. Patients taking these drugs must be warned about their possible effects on driving. Antihistamines and travel-sickness pills are other hazards to which the patient’s attention should be drawn. Dr Kuenssberg discussed
the problems of active rehabilitation, earlier discharge from hospital and the rôle of the general practitioner in dealing with anxious relatives and the adjustments which a patient must undergo when faced with a permanently crippling injury. He regretted the breakdown in communications which still occurs in 1969. He called for a 'crash programme' to deal with this major epidemic, which if it were caused by a disease would cause a public outcry.

He said that the R.A.A.C. scheme was an inspiring example to other areas, and put forward for consideration a suggested life saving kit which should be carried by all doctors at all times in their cars, and also in police cars, ambulances, A.A. and R.A.C. patrol vehicles, and district nurses in country districts, etc.

Dr Easton said that although the R.A.A.C. was financed by charity, a charitable basis was no use for general application, but that the National Health Service must accept responsibility for general organization on a local basis.

Mr Gilbert Parker summed up the proceedings and concluded the symposium by saying, "we cannot organize your service for you. We have given you ideas and shown you how it can be done. Go to it."

W. V. Anderson

POSTGRADUATE NEWS

COURSES ARRANGED BY UNIVERSITIES

The Queen's University of Belfast

Intensive refresher courses

- Sept. 8–12 General, Royal Victoria Hospital.
- 15–19 General, Belfast City Hospital.
- 22–26 General, Altnagelvin Hospital, Londonderry.

- Sept. 29– Oct. 3 General, Lurgan and Portadown Hospital, Lurgan.

The following clinical attachments are also being arranged:

- July 14 Obstetrics and gynaecology.
- Dec. 12 Combined clinical attachments.
- Oct. 6 Obstetric experience for general practitioners
- Nov. 28 Royal Victoria Hospital and Belfast City Hospital.
- Oct. 6 Clinical attachments.
- Nov. 28 Altnagelvin Hospital.

Details available from Director of Postgraduate Medical Education, 87 Lisburn Road, Belfast, BT9 7AE.

University of Bristol

Refresher courses for general practitioners

- One week courses
  - Oct. 6–10 General, Plymouth.
  - 20–24 Fresh looks at common problems, Taunton

Weekend courses

- Oct. 4–5 Developmental paediatrics, Plymouth.
- 4–5 General, Taunton.
- Sept. 5–7 Developmental paediatrics, Bristol.
- 26–28 Residential, G.P. trainers course, Bristol.
- Nov. 15–16 Developmental paediatrics, Taunton.

Obstetric experience for general practitioners

The University of Bristol is not sponsoring any formal courses in obstetrics in 1969. General practitioners may, however, obtain refresher experience in obstetrics at a selected maternity unit in one of the following ways:

1. Unpaid locum post for two weeks while the house officer is on leave.
2. Individual attachment of one or two weeks.

Interested practitioners should approach the senior consultant in charge of the unit of his choice. The following units have been recognized for these purposes—St. Martin's Hospital, Bath; Bristol Maternity Hospital; Southmead Hospital, Bristol; Maternity Hospital, Cheltenham; Gloucestershire Royal Hospital, Gloucester; Exeter City Hospital, Exeter; South Devon and East Cornwall Hospital,