

alive, if possible not in shock, with their wounds adequately covered and splinted, and without too much morphine.

REFERENCES

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DISCUSSION

A. J. Laidlaw, L.R.C.P., L.R.C.S. (Worcester): I agree with Mr London that surgery is a more useful defence than antibiotics against infection. This is particularly important nowadays because antibacterial drugs especially in hospital are in many cases losing their effect. I would like to have had his views on mouth to mouth breathing, and the use and abuses of the Brook airway mentioned by Dr Leak. Mr London rightly showed the importance of being suspicious in all accidents, and this should be emphasized not only to consultants, general practitioners, and casualty officers, but also in particular to the casualty officer's deputy. For in many cases he is the first doctor to see the case, and is frequently not at all interested in casualty work but may well be a resident from the skin, psychiatric, or gynaecological department. There have been many remarkable advances in accident care in certain hospitals, like the highly organized and efficient one mentioned by Mr London, and this appears to be the kind of hospital that has found the solution to many of the accident problems. The recently published report by the Nuffield Trust under the chairmanship of Dr Fry is certainly a most sobering and realistic report and shows that the casualty services of the various hospitals are not only in many cases decades apart, but quite often are living in different worlds. While the highly organized Accident Hospital is at work with its new techniques, we must remember that in many hospitals the x-ray department is on duty only in office hours, and although in theory someone is on call they may rarely be called. The medical profession would do well to watch with great care, perhaps forbid in some cases, the examination, treatment, and discharge of patients by nursing staff without a doctor having been called. In some instances this occurs even when the general practitioner has sent a letter, and sometimes the nurse follows up the case herself.

I enjoyed Dr Leak's contribution, and as a fellow general

practitioner I could appreciate what he said and also his problems. I too feel that much could be done to improve the teaching of first-aid and I have seen the film *That they may live*. It is a most convincing and moving film; if only we had more films like this the teaching of first-aid would be simple and certainly more effective. Those who have seen the B.M.A. films on first-aid will know just how old-fashioned some of them can be. This method of instruction does require very serious thought. I too was most impressed by the Brook airway when I saw it first. I believe it is time that we recognized the importance of this simple and inexpensive instrument.

H. Proctor, F.R.C.S. (*Orthopaedic Surgeon, Birmingham Accident Hospital*): Most of my experience of first-aid has been at the receiving end in hospital; from there it is very easy to criticize and very often difficult to do better. But the criticisms may be worth illustrating. One is the question of tourniquets. A young boy with a lacerated forearm had an improvised tourniquet on the arm, a pad put in the cubital fossa and then a bandage put round the forearm and arm. He had a very nice venous tourniquet, and for interest we assessed his blood volume and found that he was half his blood volume down. This is a constantly recurring trouble with tourniquets, and I think that the tourniquet is more dangerous than it is useful. The only sites where a haemorrhage may become very difficult to control are in the groin, the axilla and the neck. At these sites the tourniquet is quite useless and one has to rely on digital pressure or packing the wound, so that I am not really in favour of the tourniquet. It is true that usually the abuse is by first-aiders, but as doctors we are responsible for the training of the first-aid people, and if we cannot train them better than that we should tell them not to use a tourniquet.

I would also like to stress the treatment of compound fractures. One case of compound fracture arrived at our hospital with a bandage below the wound and a splint extending to the fracture, after treatment at a hospital before transfer to us. There is no excuse for it, but this sort of thing is done. The difficulty sometimes is what to put on the wound. Dressings are very inadequate usually, and what is really needed is a dressing that will cover the whole wound. In another case, compound fracture of tibia was treated by tying on a splint above the fracture with the foot free. Another compound fracture of tibia was not splinted at all, but this patient travelled comfortably. All that the first-aid people did was to pack a blanket between his legs and one on either side and strap him on the stretcher, and he was perfectly comfortable. What is the position of splints? Is there any advantage in trying to splint these fractures when a patient can be got to hospital in about 15 minutes? For a fractured femur it will take about 15 minutes to put the splint on

adequately, so surely it is best to get the patient as quickly as possible to hospital and simply lay his limb on the stretcher, and pack it round with blankets and see that the wound is adequately covered.

The phrase "ensure an adequate airway" is rattled off like saying "treat shock" when there is no first-aid treatment for shock *per se*. If the airway really is obstructed the easiest thing is to turn the patient face down with his head over the stretcher and a bandage between the two hands to rest his forehead on. Then all the vomit and blood can trickle away and his fractured jaw can fall forward and he can breathe perfectly freely.

Heating patients is still practised. I had a patient in only a couple of days ago with a hot water bottle on his belly when he was in a semi-conscious state. The heat, of course, produced burn, and further than that it produced dilation of the vessels which nature had shut down in order to conserve the blood pressure for essential organs, such as the brain and heart; if you dilate the abdominal vessels you reduce the blood pressure, but furthermore you cause sweating and reduce the blood volume further. Patients should not be heated, and the easiest thing is to put no cover on them at all.

The question of first-aid kits is very difficult because if the kit is going to be small the dressing is usually inadequate. We have dropped the more adequate dressing that the Army used to supply as a shell dressing; this is of reasonable size and has a good pad on it so that it can be bandaged tightly; most bleeding can be controlled by firm pressure bandaging without any attempt at putting on wonderful improvised tourniquets which are agonizing.

Dr Potts: In view of the difficulty of diagnosing major injury, how is that to be assessed at the roadside, and by whom? We hear more and more of the development of big accident centres to which the major injury can be taken direct. Undoubtedly, if the patients get there they will be likely to get better treatment. But in this region when we have four accident centres, patients will have to travel fifty miles or more. I would like to ask whether, even though the patients are likely to get better treatment when they get to the major accident centre, it is not inevitable that more patients will be brought to them daily?

J. A. Kay, M.B., B.S. (*Endon, Staffs.*): I would like to ask advice on the place of transfusion in treating a serious casualty before the patient gets to hospital. This is significant in our area where it may be an hour after first examination before a patient in severe shock arrives at a casualty department and receives resuscitation. I am aware of the difficulty in crossmatching blood if dextran has been given, and I know it is important to take blood, but we have not

heard any comment at all on transfusion as first-aid treatment.

Mr London: I think the definition of a "major injury" and transport to hospital must depend to a very large extent on the site of the accident, whether it is in a well populated district with easy transport and short distances, or whether it is out in the wilds, perhaps with only very poor roads and a lot of bad weather. Much of what I said was based on experience of a populated centre with easy communication. I think it must be very difficult to know at the roadside what is in fact a major injury requiring movement to hospital. If there are undoubtedly major fractures, then there is no question—the patient should go to hospital. If there is likelihood of crush injuries, and this applies in many road accidents, in mining accidents, and in falls from buildings, then again it is best to be on the safe side. I think this question must precede accurate diagnosis and successful treatment. With heavy clothing in cold weather the difficulties of diagnosing, of distinguishing the important from the trivial are multiplied, and I do not think there is any easy way out of that. I think that if we are going to agree that seriously injured people should be treated in certain designated centres and not at the nearest hospital, we must be prepared to see more patients coming to those centres, perhaps some of them unnecessarily.

I think that the question of transfusion as first-aid procedure at the roadside hardly arises at all. We occasionally receive requests from outlying hospitals to deal with patients there and we have gone out and provided transfusion for them in a cottage hospital, or perhaps a slightly larger one. The need for transfusion is based on one's estimate of the number and severity of the injuries, and in the early stages clinical shock may not have developed at all. Indeed, with young healthy people with injuries affecting the limbs only there may be a loss of 20, 30, 40, or even 50 per cent of the total blood volume without any of the physical signs of clinical shock. These may develop very suddenly, as a result of pain, a stopped leak, disturbance, chilling, and so on. The need for transfusion then should be based upon one's estimate of the patient's injuries (this applies to the early stages) rather than upon his general clinical condition, blood pressure, pulse, and so on.

I am afraid I have not answered the question "What is a 'major injury' at the roadside?" I have talked round it, because I have little or no experience of major injuries at the roadside. All I can do is to argue back from the position in hospital, recognizing the difficulties of diagnosis in the dark, in bad weather, in a heavily clad patient, with little or no knowledge perhaps of what has happened. The doctor is the only person on the scene, apart from the injured person. What one should consider is the likelihood of

crush injuries. One should be able to detect major fractures or head injuries, and suspicion that these injuries are present should prompt removal of the patient to the nearest centre that can treat him adequately, in the wilds perhaps to the nearest centre at which he can rest and to which transfusion and resuscitation resources can be brought if necessary.

Dr Potts: I did not make my point clear. It was not to give a definition of a "major casualty", a case that should be taken to hospital. But we hear increasingly that patients with major injuries should by-pass the nearest hospital and go direct to an accident centre. Who is to decide which ones are to by-pass the nearest hospital and go possibly 50 miles?

H. L. McMullen, F.R.C.S. (Casualty Orthopaedic Surgeon, Rotherham): I am glad we have reached the point of trying to define a major injury, and I think that our definition adopted in the South East Metropolitan Region might be of help here. There are really three definitions required. First of all, a major accident is one in which fifty or more people are injured. This is a problem of organization, and our plan is that the most senior doctor available at the hospital will go to the site. There is no question of a junior doctor going. This is a separate issue from the one which has just been discussed, of major and minor injuries. Our definition of *a major injury is one requiring ambulance transport: a minor injury is one which leaves the patient ambulant*. It is quite obvious from what Mr London has said that certain clinically major injuries will in fact, by that definition, initially be regarded as minor, because, like the young man with the ruptured duodenum the patient will walk in to the accident centre. The value of this definition is that it allows an immediate rule of thumb differentiation of casualties into major and minor. This means that there is no opening left for decision; the ambulance team know that they are called to an accident, they are dealing with a major injury, and they take it to an accident centre.

The difficulty in implementation of this arises from the disposition of accident centres. If you have them at intervals of 50 miles it may be very difficult to say that all major injuries go direct to the accident centre. We are planning on an interval of not more than 20 miles. But it is not really miles but minutes that count, and I think there are two questions that I would like to put now. Is it preferable for the patient to go first of all to the accident centre, where there are all the facilities, with 24-hour staff cover, and all the necessary auxiliaries? Or is it preferable for them first to go to a point where triage takes place, and somebody comes in who may or may not have adequate experience and may or may not be able

immediately to decide whether the patient is to go on to the accident centre? And secondly, what is a reasonable distance or time of travel for the patient? What is the balance between triage at a point close to the accident and immediate transport to the accident centre?

R. F. L. Logan, M.D., M.R.C.P., D.I.H., C.H.P. (*Research and Social Medicine, University of Manchester*): I would like to return to Dr Potts' question. When we are trying to organize a streamlined accident service, I think we ought to admit that we are all likely to be wrong. In assessing cases that may be faced with a 50 mile journey before they can get to the accident centre, I should say that the problem can be divided into three. There are the cases that we are quite sure are major injuries; there are cases which we are quite sure are minor injuries; and there are quite a lot of cases where we do not know. It is quite clear what we are going to do with the first two groups but what should we do with the ones where we do not know? There is a danger that a large number of these doubtful cases are going to be sent 50 miles unnecessarily. But it seems to me that the only way we can decide about the doubtful cases is to keep them under observation. They should be sent to the nearest hospital, irrespective of its grading, and kept under observation. Then the point arises, what happens when they prove to be major cases after all, and you wish you had sent them the night before the 50 miles to the main hospital. That is the time when the major hospital staff should come out to the minor hospital and help, and that I think is the real solution. If we are going to grade hospitals there must be a good system of sending out teams, not crash waggons, but teams which will help the local hospital in difficulties, because it has originally taken in a case as a result of a calculated risk which has not come off.

R. Hunt-Cooke, M.D., M.R.C.P. (*London*): One of the minor administrative difficulties which could be very rapidly and easily rectified is the fact that when I go out to an accident, at which an ambulance arrives having received a 999 call, the driver has instructions to take that patient to a hospital, and no amount of arguing will make him go elsewhere. Provided one insists on having the case taken to a certain hospital on one's own responsibility it can sometimes be done, but the hospital may not take the case because it has no casualty department. That has actually happened to me twice in the last year. I think that every general practitioner should know or have a list of his nearest general hospitals with efficient casualty departments, and his nearest appropriate specialist centres to which cases can be sent, if he is willing to take the responsibility of dividing these cases up on the spot.

Mr Gissane: Dr Potts knows the answer to his question, because

we have been over this together at Redditch. He knows that he has a general-practitioner service at that particular hospital ready and willing to go out in the ambulance and examine the injured person and give instructions to the ambulance immediately where to take that person if on the doctor's quick examination he thinks that it should go to the accident centre. He knows that, if he is in any doubt, he keeps the patient in his cottage hospital for observation.

What we have to agree about is the requirement of the accident service as it was defined the other day. We have got to think, not so much about a casualty service as a whole—emergency medical and surgical cases and casual attenders—but about accident services. I wonder whether in your high echelon of committees, Mr Osmond-Clarke and Mr Norman Capener, you really can afford to neglect the value of people who look at accident problems as Mr London has presented them to you.

H. Osmond-Clarke, F.R.C.S.I., F.R.C.S. (*Orthopaedic Surgeon, London Hospital*): I cannot allow that challenge to go, for I am lost in admiration every time I hear Mr London or indeed anybody from the Accident Hospital speak. All I can say is that Mr Gissane is doing, and has done during the time he has been at the Accident Hospital, what I hope the Royal Colleges will insist on doing in a future programme, namely, insisting that a man by the time he gets his Fellowship and before he is engaged in practice alone of any kind, is of the calibre of these men.

Mr Capener: We have all been greatly stimulated by the work which Mr Gissane has done all these years, and we are full of admiration for his products. But there is a tendency, and I heard it this morning, to decry the casualty work of the skin, ear, nose and throat, and gynaecological house surgeons in hospitals. Those are just the men we have got to train in general accident problems. I had a fiery time the other day with one of my general surgical colleagues, who said that his house surgeon was not on any account to do any work in the casualty department, because that was the job of the orthopaedic house surgeon. This is a lamentable position. Every young man, whatever his department of medicine, must be trained in casualty reception and casualty work and it is only by that means that we can get properly trained men with a general background. I was called only the other day to an accident late at night. A man was dying from multiple injuries (head, legs, and so on) and one leg I had to amputate, but before I could get to this stage the staff were pumping in packed cells, an anaesthetist was at the head end trying to cope with the situation and the man was rapidly dying. I said, "Will you please open that man's mouth and give him some oxygen", and immediately the man's general condition

improved. It is not the requirement only of an anaesthetist to see that oxygen is given; the surgeon also has to watch the whole problem and I think we have all got to get our general training and our general experience. I really think we should be careful how we use this word "general surgeon".

However, there is one question I really wanted to ask Dr Leak, which is perhaps more important at the moment, and this is in connection with such major accident problems as the railway accidents in Sutton Coldfield and in Cheshire. Sutton Coldfield was easy because the general accident hospital was nearby. But what is the place of advanced surgical posts under those conditions? I have been told that it is not necessary, the patient should be moved as quickly as possible to the nearest hospital, but out on Dartmoor or Exmoor or along some of the main railway lines of Scotland there are no accident hospitals even within 50 miles. Should we not establish advanced surgical posts with mobile units at a school or something like that?

Dr Leak: As regards Mr Capener's question, I did touch on it yesterday, when I said that I did not think we should get a really good accident service until we had people, a dozen or more, to organize services in their area all over the country. I have spoken to the R.A.F. and they would be delighted, they tell us, to be called on at any time to provide a helicopter, or to take anybody anywhere. It is exactly what they are wanting to do, and I do not see any reason at all why the Government should not give authority to certain people in certain regions to take a team by one or two police cars or helicopters or whatever you will anywhere to an accident out in the wilds. And may I refer to what Mr Proctor said about tourniquets. What would he do if he had, as I had, only two or three doctors, 27 people dying, another 60 injured, and one patient bleeding? Would he put a pad and bandage on? Is it not vastly better to have a tourniquet you can apply for the moment and then look after the patient later. Tourniquets are always dangerous, but there are occasions especially where there are a number of casualties in which a tourniquet can save lives. To that I stick.

I also repeat that in every ambulance in Cheshire there is carried a list of hospitals in the area with the number of casualties they may be expected to cope with, and even more important a list of the hospitals specially equipped to deal with chest, head injuries, burns, and so on. Now, if that were done all over the country the question that Dr Cooke raised would not arise, because the ambulance driver would simply hand the doctor the list.