DISASTER MEDICINE

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Disasters are extraordinary phenomena which happen suddenly and involve groups or populations of whole villages, cities, regions or nations. All of a sudden, they are overwhelmed and they find themselves in conditions of extreme emergency, without even the possibility of using those structures designed for assistance and treatment. In the face of these phenomena, the answer in the past has always been phylosophical resignation and the recognition that, in whatever way they were faced, human efforts were incapable of alleviating the consequences.

The great catastrophes of the past have, in fact, no history. Earthquakes, floods, volcanic eruptions and large-scale epidemics underwent no change and have all been remembered as manifestations of great sufferings. They have been responsible for great lacerations of consciousness, but also for demonstrations of the great capacities man has shown in overcoming them and, they have been full of high moral significance.

Today the situation is partly different. The great progress of science has guaranteed the conquest of exceptional records and the abundance of means permits extraordinary protection and salvage never before dreamt of. Thanks to all this, some calamitous events are no longer what they were. The large-scale epidemics, especially influenza and cholera which still happen periodically, cause apprehension, but in no way do they reach high danger levels. The same cannot be said for the other catastrophes which, as in the past, happen more or less regularly and are responsible for extremely doleful effects. Disaster Medicine, as is well-known, deals with those medical aspects of assistance to the persons who are victims of disasters.

The term disaster means natural calamities (earthquakes, tornados, floods) and those caused by man (wars, acts of terrorism, road, air, and rail accidents and shipwrecks). Even in today's international society. which is one of widespread communication, catastrophes happen suddenly and they find the very organizations, detailed to deal with them, unprepared. The most recent natural catastrophes have demonstrated the urgency of a territorial policy which disaster medicine must promote, precisely because such a policy is part of prevention which is one of the tasks of disaster medicine. Prevention in this field, in fact, makes for greater participation and, at the same time, carries out a generalized sensitization which is an important premise for the defence of the individual person and of the collectivity.

There is, however, another aspect which disaster medicine must take into account. Differently from normal conditions, catastrophes often cause a real contradiction between generosity of intervention and its rational application. Even though both are necessary, they can harm one another because of the anxiety which catastrophes produce.

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This is why disaster medicine demands vigilant co-ordination of strength, intelligence, practical utilization of resources and a clear view of priorities. When there is a disproportion between large numbers to treat and the means available to deal with them, one must always have a clear awareness of what is a priority and what cannot be renounced.

The International Society on Disaster Medicine, whose President is speaking to you now, is a worldwide organization. There is no doubt that its real step forward, at the operative level, is the maximum co-operation of all the existing forces. From this follows the urgency of developing the organizations, both national and international, which work for mutual assistance. In this field, it must be said, much need to be done to overcome ideological barriers, political prejudices and commercial interests both open and occult. When suffering makes us aware of the substantial equality of the human condition, the urgency of mutual aid must prevail over everything and become the unifying element capable of creating new forms of solidarity. So, the development of disaster medicine must find expression not only on the level of interventions after the catastrophe has taken place but, above all, on the level of prevention. All the more so, since there are cyclic catastrophes which seem to strike with punctual and dramatic regularity certain areas of the earth. Unfortunately, it is historically and daily evident, that the weakest people are those most exposed, so that their cry for help is a constant fact which cannot, with moral impunity, be ignored.

It is easy to imagine what benefit and what hope can be opened for humanity if, side by side with its technical and economic development, we were to witness an increase in the means of prevention and intervention against catastrophes. If these can sometimes be defined as unexpected and unforeseeable, they can never be said to be unknown in their nature, their effects and the extent to which they may occur.

The task of disaster medicine answers to a need always felt by mankind. The progress of our times enables us to answer this need in terms of real civilization. Man or society cannot, therefore, be considered capable of real progress when they neglect self-defence against calamities which, inevitably or by their own fault, afflict them. Disaster medicine is a real step forward for medicine as such. If its intervention, in so far as it is carried out on large numbers of injured people, is modest, its effectiveness can be decisive. Science and conscience, material means and resources of the spirit are essential presuppositions for an effective disaster medicine. Since we cannot prescind from an ethical vision of reality and of its mission, the hope, then, is not only for an increasing and progressive organization of disaster medicine interventions, but also for its place among the clearest and noblest expressions of human and civic progress.

Disaster medicine is undoubtedly a challenge to medical organization. In fact, medical structrues which are often unprepared and certainly put "to test" when confronted with a single seriously-ill patient, must face formidable problems when the number of acute and serious cases multiplies. Even if the greater part of catastrophic events can appear to be "unforeseeable", there is, however, no doubt that in many cases there is the possibility of intervening with measures capable of avoiding such events or,

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at least, limiting their effects. However, in the best conditions of foresight and prevention, there remains a certain margin of probability that catastrophes or calamities will equally occur. This further stresses the indispensability of programming the assistance interventions so as to guarantee, at every moment, the maximum efficiency and speed in facing the abnormal situations that might arise.

Knowledge of the disaster territory is fundamental to help in ganging the actuality and the potentiality of the catastrophe when it happens. The first task, then, appears to be the collection and determination of the nature of the territory, of the ways of communication, of the types of existing structures and their actual situation of stability and of the existing or foreseeable meteorological conditions. This body of information, kept up to date, is a fundamental requirement both for the whole territory of each country and for the work of aid and prevention. The problem of collecting data is extremely complex, especially when one finds bodies, organizations and different personnel operating in the work of assistance. And it emerges that it is a task almost impossible if this collection is not carried out on programmed lines which must be extremely simplified in the type of information required from the quantitative and qualitative points of view. A simple printed form, on which it is possible, with simple notions, to provide the essential data, could greatly facilitate the task of the assistants charged with the collection of data, even if they are very different. An important problem which has often been discussed is the following : should the already existing structures or structures purposely designed for catastrophes be used for medical assistance ? Without doubt, already existing structures play an important part : in fact, one cannot imagine preparing colossal permanent assistance structures which would then remain unused (fortunately !) for many years.

It is clear, then, that given the indeterminate nature in space and time of catastrophic event, medical services designed only to intervene in cases of catastrophes must be absolutely excluded. It will therefore be necessary to prepare emergency plans which envisage the utilization of the medical services normally present in the territory, according to plans which foresee the progressive activation of the existing resources and which will extend, like an oil slick, from the point where the calamity has occurred.

The participants in the Third World Congress on Disaster Medicine held in Rome in May 1983 - and which some of you will remember - commited themselves to :

1. activating a closer collaboration with civil protection bodies in the areas where each belonged;
2. continuing and developing individual activities in a multi-disciplinary context so as to satisfy the social, medical and economic needs of the territory and of the existing resources;
3. collecting and evaluating the information which has emerged and is emerging from the various disasters in order to identify the factors of greatest risk and to study the hypothesis of a World Data Bank for Disaster Medicine;

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4. identifying the existing territorial resources to meet the demand for emergency medical interventions as well as the real capacity of fulfilling this demand;
5. defining the fundamental parameters necessary to achieve collaboration between medicine and civil protection.

Not only has the importance of this kind of collaboration been stressed at the national level of the different participant countries, but the necessity has been highlighted that in the case of a maxi-emergency, a collaboration which crosses territories nations and ideological frontiers, is a decisive factor. The problems which a natural calamity or a disastrous event pose for the whole civic community are enormous and not easy to solve. Besides the men and means which are so necessary, there is a need to keep the attention of public opinion alive and to verify continually the will of politicians. Their contribution is indispensable for ideas, plans and suggestions to become concrete and operatively valid.

The principal point when facing a disaster situation is to give an immediate answer to the problems it poses, that is, to prepare beforehand programs which envisage hypothetically, the different possibilities and which include the most important organizational measures. These are complex and extraordinary problems whose answer is only possible if an attentive provisional study has been made beforehand of the conditions which the society might meet in the future. It is not easy, however, to lay down laws and to make projects for whose implementation the use of many disciplines is necessary. Without looking for more indications, I think at least three points should be touched.

The first is the preparation of the public opinion of each country by means of general information about the charasteristics particular disasters could assume, by giving elementary notions for a first orientation. This information will be all the more useful if it also includes the minimum measures to be adopted. Indications will also be given on how to avoid adding to the damage caused by the disaster, the harm caused by a lack of public co-operation.

The second point is the formation of adequate medical personnel to whom the various areas of assistance and other specific tasks will be entrusted. In particular, use should be made of those doctors who by reason of institutional tasks, specific training, experience or mentality, live their professional lives in the field of everyday emergency.

Finally, there are the problems of research to get to the heart of the techniques of multiple assistance. Even if in some countries disaster medicine has been faced for some time with success, nevertheless, one cannot pass over in silence how in others the situation is still rather precarious. It is only recently that politicians are becoming aware of a reality which must be faced with courage, commitment and continuity. It is only with a joint and co-ordinated effort of the different national forces overcoming - as I said at the beginning - egoism and barriers of every kind that a certain and positive result can be reached for the populations hit by a disaster.

These general considerations, opportunely integrated, can, I think, be the basis for a fruitful discussion of our subject.

DISASTER MEDICINE - TRAINING OF MEDICAL AND ANCILLARY PERSONNEL

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Introduction

Before going into the question of the special training of doctors and paramedical technicians volunteering their services for medical disaster relief, it is worth defining the duties that they will be called upon to perform and consequently, the (physical and mental) qualities and the professional competence that they must have. To arrive at such a definition, we must study the general conditions imposed by "the disaster". It should be understood that each natural or technological disaster also gives rise to special problems.

In this regard, we have the history of past disasters - of which there is no shortage, even in recent times (the most instructive) - together with the experience gained from manoeuvres and exercises (which are increasing in number) and eye-witness accounts. We must also make use of published works on the topic, including those contained in the bulletin "International Civil Defence" and, in particular, those of Marcel Dubouloz. We shall also draw on the works of P. Lagadec. Finally, we shall also draw on the paper on a similar topic which we presented at the last Emergency Care Training Centre (CESU) symposium, in Reims, on 12 September 1984.

I. Conditions imposed by the catastrophes

A catastrophe is an event which takes a turn for the worse (from strophe : turning, and cata : wrongly), which is sometimes provoked by a cataclysm (a terrestrial upheaval) or, in any event, by an ill-omened or even fatal occurrence - resulting in deaths, or again by a disaster, also ill-omened because it occurs under an "unlucky star". In any event, it is a calamity producing a large number of victims.

The victims

One of the main characteristics of disasters is the flood of victims which they produce. They are also seen basically as happening suddenly, so that the explosive increase in needs exceeds the immediately available relief resources, to use the definition of R. Favre ("L'homme et les catastrophes"). It is not just the number of victims which raises problems, but also the nature of the effects produced :

- In most cases, the majority have sustained multiple injuries (sometimes of a special nature, such as blast injury and crush syndrome), but also very often they are suffering from burns or frost-bite, poisoning (airborne in particular), contamination (e.g. by radioactive substances), prolonged immersion in water or dehydration;
- There are also such indirect effects as premature births or heart attacks;
- Another condition is panic, often less widespread than anticipated, but nevertheless presenting very specific problems;

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- Finally, there are the bodies, the identification and "processing" of which call for very specialized skills.

Urgent needs and the scarcity of resources

The time factor is obviously of paramount importance in the event of a disaster :

- At the initial stage, medical teams must take the minimum of time to arrive, provide treatment, classify and evacuate. The shortage of time available is exacerbated by the number of victims, difficulties of all kinds (terrain, material damage, communications, transport, weather) and by the fact that resources of all kinds are invariably in short supply or unsuitable;
- However, in the event of major disasters, which are always followed by after effects, it is the duration of relief operations which presents the problem in the form of continued treatment, prevention and sanitation, replenishment of supplies, replacement of medical teams, and so on.

Wide range of relief workers required

The management and carrying out of relief operations in the wake of a disaster call for the involvement of a wide range of disciplines. This is evidenced by the ORSEC plan list of services, which are six in number, including "medical care and mutual assistance". The quality of "relief" (to relieve : to provide assistance) depends firstly on the "rescue" procedures (to rescue : to remove from danger). The medical teams can go into action only with or after rescue workers. They must be aware of, if not deal with, problems of transport, clearing operations, communications, housing, police, etc. They must be integrated in a rigorous and disciplined manner into a general plan which co-ordinates the various services. Naturally, health personnel must use the same terminology and thus have received the same training. However, they must also be able to communicate with other non-medical personnel. Disasters give rise to common problems of strategy (planning), tactics (implementation of plans), and logistics (supplies). These problems must be solved in accordance with a single policy.

II. The medical relief "chain"

Regardless of the type of disaster, medical relief is delivered in stages, according to a sequence which, while generally accepted, may be tailored to fit the circumstances. It comprises in principle :

- Pick-up,
- Transferral (shuttle) to an advanced relief post,
- The relief (and initial triage post known as the Medical Aid Post (PSM),
- Transport to a Medical Evacuation (and secondary triage Centre (CME),
- Evacuation to hospitals in the rear.

At the pick-up sites, the PSM (several pick-up sites) and CME (several PSM), medical assistance is supervized and regulated by senior doctors and directors of medical relief (DSM). Area headquarters and the national headquarters (CODISC) comprise health units and DSMs. Medical disaster personnel should be able to perform this wide range of tasks.

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At all stages, but, of course, particularly in the disaster area, he must be assisted by knowledgeable technicians, using the same terminology.

III. Training of medical teams

Disaster medicine thus has its own identity (Dubouloz), even although it derives from the attitudes and methods of emergency medicine. The possible number of casualties and the wide range of injuries sustained, the short time available for the first phase, the disorder arising out of devastation, the lack of resources, the need to work in close co-operation with all other sources of assistance and to be fully familiar with the relief plans, and the variety of tasks which may devolve upon medical teams, all show clearly that disaster medicine cannot be improvized. Consequently, it requires special training. This training must be theroretical and include :

- For doctors and paramedical auxiliaries : Serious study of strategy (general and specific action plans), and logistics; A clear understanding of tactics in the various situations that may arise; Detailed instruction in simplified and standardized techniques, not only medical and paramedical (first aid, triage, records, convoying), but also in the areas of telecommunications, transport, consignments of equipment and materials, food supplies and shelter.
- For doctors : Refresher courses in semiology, supposedly a familiar subject, but in this case as applied in difficult circumstances, mass hygiene, forensic medicine, toxicology and nuclear medicine; Effective if standardized treatments calling for a limited range of medication and equipment.

In this field, doctors must adopt an approach different from that followed in normal medical practice, by making the transition from an individual approach (for example, the duty to persist in the treatment of a single patient) to a collective approach (for example, the duty to sacrifice hopeless cases in the interest of saving the largest number of victims). All members of the team must also be able to act quickly and have "conditioned reflexes" for such action. They must display professional skills, physical strength, the ability to adjust to unexpected situations, the ability to follow orders and, in the case of team leaders, to give orders. Their training must therefore also be practical and reinforced by full-scale exercises.

The teaching of the theory of disaster medicine and, in particular, the essential task of determining what has been learned, is obviously a job for the universities. In the case of paramedical personnel, further theoretical instruction can be given in France by the Emergency Care Training Centres (CESU) attached to the SAMUs based in a university-hospital centre. Practical training, however, devolves upon "field men", such as the members of the health services of the armed forces (in particular the Paris Fire Brigade and the Naval Fire Battalion) and the Civil Safety Service. In this way, the disorder and amateurism still all too often seen in disaster areas can gradually be replaced by a more methodical, organized and professional approach, within a generally known and accepted doctrine.

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Example of training programme - Disaster medicine training in Créteil

1. Theoretical part

In 1981, the University of Paris XII - Créteil became the first to offer a university diploma course in disaster medicine for doctors (previously, faculties of medicine had offered no specialized courses). The originality and effectiveness of this training course derived from the fact that it was offered jointly with the Health Service Directorate of the Armed Forces. A "Proficiency Certificate" for paramedical personnel is currently under study. In the meantime, they are admitted free to such Faculty courses as strategy, logistics, tactics and methods.

The aims of the course can be deduced from the general observations made above : doctors and medical auxiliaries are trained to provide on-the-spot assistance in the event of natural or other disasters, armed conflicts or accidents resulting in considerable loss of life and material damage, and to participate in organizing relief and mass medical and surgical treatment in accordance with predetermined relief plans; in other words, they are taught how to operate a medical relief chain by effective integration at its various levels.

Procedure for teaching of theory

The programme comprises two sessions each year, the first consisting of two days full-time instruction per week for a period of six weeks, and the second of 12 days full-time instruction over two weeks. A maximum of 50 doctors may enrol for each session, with priority being given to holders of the French State Diploma of Doctor of Medicine or an equivalent foreign diploma. Paramedical personnel are also free to attend lectures.

The candidates come from all regions of France and from abroad. Of the 251 students who have taken the course thus far, 34 have been foreign (holders of a diploma), having come from 16 different countries, on four continents, specifically to take this course. All are particularly highly motivated by virtue of their professional background. They include : 13 civilian anaesthesiologists or heads of emergency services, 13 military doctors or surgeons, 3 Civil Defence doctors. A similar distribution - anaesthesiologists and military doctors - is found among the French holders of diploma, with the addition of Fire Service doctors.

The theoretical part

This part involves 80 hours of instruction. The University of Paris XII, in accordance with its official mission, has sole responsibility for organizing and supervising instruction with the assistance of teachers from the schools of the Health Service of the Armed Forces. The teaching body comprises : 12 civilian university lecturers who are either from SAMU or SMUR or are specialists in the Fire Service, Civil Safety or non-Governmental humanitarian organizations, 22 military specialists from Health Services of all the Armed Forces.

The content of the programme comprises :

- 5 hours of introduction to the background and the various types and classification of disasters; Justification of the discipline and the qualities required of medical disaster personnel.

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- 16 hours of strategy and logistics (national and international relief plans).
- 16 hours of tactics, depending on the various simulations (shuttles, pick-up, triage, evacuation).
- about 10 hours of procedures, which should already be familiar; this is simply a refresher course.
- finally, 33 hours on pathology and treatment of the various types of victim, including those suffering from shock, gas inhalation, blast effects, burns, injuries inflicted by projectiles, cranial, facial, thoracic, abdominal and vascular injuries, multiple injuries, radiation, contamination, panic, etc.

Theoretical knowledge : is tested by written examination to be completed in a given length of time, and designed to assess the behaviour of students in a given situation based on actual or fictitious disasters. Examination papers are completed anonymously and are marked twice, on the basis of a grid of key words drawn up by various markers. Practical knowledge is tested by means of an exercise. Of 251 doctors who have taken the course thus far, 220 have obtained the diploma. The failure-rate varies from 10 per cent to 15 per cent, depending on the session. The high pass-rate seems to be linked to the fact that the course is taken essentially by doctors most of whom have already had to deal with the problems of relief and emergencies on a daily basis and are motivated by this special discipline. It is nevertheless both useful and necessary for doctors to accept the "refresher course" principle. For this reason, holders of the diploma are recalled for annual exercises and manoeuvres. Thus far, 90 holders of the diploma from the first four sessions have been invited to take part in field exercises, and 42 of them have agreed to participate at various stages of the relief chain.

Since 1981, other universities (Bordeaux, Lyon, Marseille, Toulouse) have set up similar training courses. However, the problem of standardization of instruction with a view to ensuring at least a unity of approach, terminology and methods, is beginning to arise. The Directorate of Higher Education of the Ministry of National Education seems to be favourably disposed towards the idea of a national "standard" which only a few universities are in a position to offer.

Practical exercises

The theoretical training which culminates in a conventional written examination, has, from the outset, been supplemented by practical exercises, for which a mark accounting for half the total is also awarded. The confusion and inability to cope too frequently observed during national Civil Safety manoeuvres and during successive diploma courses quickly convinced us of the importance of the final exercise, in which doctors and auxiliaries can be confronted with the practical problems which they will encounter in the field.

Relationships with the fire services and elements of the military, an understanding of the difficulties of organization and command, the protection of the injured and staff against cold and water, autonomy of individual and medical equipment are all aspects which can be properly appreciated only under realistic conditions. In addition, a twice-yearly exercise is held at the National School for Non-Commissioned Officers of

the Health Corps of the Ground Armed Forces (ENSOSSAT) near Orléans, in conjunction with the School itself and with the Fire Brigade of Loiret. The regular participation of the SAMU staff in the national manoeuvres organized by the Civil Safety and, in particular, of "recalled" holders of the Diploma of Disaster Medicine, as on the occasion of "Vosges 83", where they represented 30 of the 110 doctors participating, rounds out this practical training.

Practical organization of the exercise

The Orléans-Chanteau Camp, which is the headquarters of ENSOSSAT, has been chosen for six of the seven field manoeuvres; military precincts, catering facilities, meeting hall, staff, supervisory personnel and equipment are essential. A detachment of the Loiret Fire Brigade has participated since the second exercise, in 1981.

A preliminary meeting is held about a month before the exercise to establish basic principles and staff and equipment requirements - particularly helicopters. A plan of campaign and manpower and equipment tables are drawn up following the meeting. At the last theoretical class, a briefing is held to remind students that they should wear warm and comfortable clothing, carry their identity numbers and assemble punctually at the SAMU base in order to take the bus ordered for the occasion.

Instructions are given for the first time :

- Act out in full the various phases of the procedure : reconnaissance, pickup, assembly of casualties and first aid at the advanced medical post (PMA); Organization of shuttle from the PMA to the Medical Evacuation Centre (CME); Setting up of the CME; The main shuttle for evacuation to the rear is not "acted out", only the transfer of the injured to three loading points for evacuation by rail, road and air, is carried out.

- Draw-up medical cards legibly and conscientiously, on the basis of the cards carried by the students of the School, acting as "casualties", which enable the accuracy of clinical examinations and preparation for transport to be checked.

- Administer first aid to the injured and prepare them for travel, in as realistic a fashion as possible.

Practical exercise of 29 May 1984

The equipment supplied to the students (in the knowledge that, in the light of previous manoeuvre experience, it would be necessary and sufficient) was as follows : one disaster kit, including three trunks and a relief bag, one table, two megaphones, "PMA" and "CME" signs, three oxygen cylinders and two electric aspirators, medical cards. The auxiliary personnel are, inter alia, responsible for this equipment.

10.30 a.m. : ENSOSSAT Assembly Hall, report by deputy-chief physician on wartime health services; discussion, followed by meal. During this time, the staff of the School, assisted by two supervising doctors from SAMU, make up the 50 casualties and explain to them what they are to do. 1 p.m. : the 50 casualties take up their places in undergrowth at the two disaster sites.

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The scenarios adopted on this occasion are :

- Site 1 : explosion, 25 casualties with injuries from flying fragments, and suffering from burns and blast effects.
- Site 2 : 25 casualties with gunshot wounds, such as might be sustained in an outbreak of urban violence.

Intervention :

- Activation of the PMA and the CME, establishment of the PUMA.

- Arrival of the detachment from the Fire Service, including three VSABs, one van, one marker truck and two light vehicles.

- Setting up of the School resources : three TP3 health vehicles, 50 stretchers and 20 stretcher-bearers.

- Positioning of "supervising" doctors, whose task was to mark students on the main stages, namely, pickup, PMA and evacuation on first shuttle, CME, and final interrogation after triage, at the main shuttle loading-points, on the characteristics of the various carriers.

- Setting up of radio links between the PMA and the CME, with E/R TRPP13 transceivers.

- Division of students into two groups, one for each site.

- 1.30 p.m. : a series of explosions, a burst of gunfire and dense smoke signal the beginning of the exercise.

- At a given radio signal, the Fire Brigade detachment undertakes a reconnaissance of the disaster area and divides it into two separate sites. They mark out the sectors with coloured tape. The students then begin to pick up the casualties, to fill in the medical card on the basis of the details recorded on the casualty card and organize the stretcher service to the PMA, where equipment is made available to them. At this point, it is necessary to designate one or two "leaders" at the PMA, where the casualties are divided into two groups, serious and not serious, and first aid is administered.

- The organization of the convoys of health vehicles and the use of airborne transport, depending on the priorities for evacuation to the CME, are assessed at this point. At the CME, the extreme importance of internal organization in triage tents becomes apparent : registration of incoming casualties, examination of victims, classification according to degree of urgency (EU, U1, U2 and U3), preparation for transfer and choice of means of evacuation (road, rail or air being the most obvious), and, as for the other phases, the need to designate a leader to deal with incoming and outgoing casualties is obvious.

- At the CME, an important aspect of the students' knowledge is assessed, namely, the classification of casualties and, in particular, medical treatment.

- Finally, the student accompanies his stretcher-borne patient to a loading point, selected at the evacuation allocation point in the CME, where he is questioned for the last time. The exercise concludes with a crucial debriefing session. Following a reading of the medical cards, the marks for the five phases of the exercise can be added to the grade for the written examinations.

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The theoretical and practical training of medical teams has already begun to bear fruit. On 15 July 1983, at Orly Airport, a bomb exploded, killing eight persons and injuring 60 others, 20 of them very seriously. The pickup, first aid, triage and evacuation by four convoys of 10 ambulances and a four-helicopter shuttle, took only two hours, and no secondary death was recorded. The first aid, which was supervised by a Senior Physician of the Fire Brigade and by a doctor from the SAMU concerned (SAMU 94), was administered by 30 doctors assisted by the same number of paramedical personnel. Seventeen of the 30 doctors were already holders of a diploma in disaster medicine.