THE ROLE OF EDUCATION AND TRAINING OF MEDICAL PERSONNEL FOR CASES OF MULTIPLE CASUALTY INCIDENTS IN CIRCUIT MOTORSPORT RACES

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Summary
Triage is a very important part of the Major Incident care. To perform an effective triage it is necessary to have well-trained triage personnel, a good triage system and also a triage documentation. These components can prove particularly important in managing mass casualty incidents at motorsport events. The following paper demonstrates, after a short description of the particular situation at such event, how effective a good documentation, and education can be. We measured the time of the triage, and accuracy in two triage scenarios – before and after new documentation and education – during the events at the Hungaroring. We realized, that education and a good triage system and documentation has a significant role in shorter triaging time, and in the effectiveness of triage.

Key words: Major Incident, Triage, Education, Triage documentation, Motorsport

INTRODUCTION

The possibility of a multiple or mass casualty incident (MCI) occurring within the confines of a circuit was vividly illustrated by the accident at the start of the Belgian Grand Prix at Spa-Francorchamps in August 1998. While no injuries occurred, this incident could easily have resulted in 10 severely injured drivers and multiple victims among the public. The way a medical rescue team approaches a MCI differs in number of ways from the approach to single-victim incidents.

This mode requires considerable organization and planning. Experience has shown that this specialized mode of functioning cannot and will not instantly happen should a MCI occur. In addition to the public (for which a separate plan must be drawn up by the responsible officers), the current motorsport environment presents several high-risk areas. These include the circuit itself, the pit-lane and/or service areas, and the paddock.

DEFINITION OF A MASS CASUALTY INCIDENT

While many definitions of a mass casualty incident can be found, the most useful in the context of the medical organization of motorsport events would simply be an incident involving a number of victims sufficient to create an imbalance, however temporary, between the requirements for treatment, and the ability to provide that treatment. For example, in terms of current staffing and standards at Formula One races, this would roughly translate to five or more seriously injured victims, or eight to ten (or more) victims with mixed levels of severity (1). In Hungary MCI is defined as a situation involving five or more victims on an accident scene.

PHASES OF MANAGEMENT OF THE MCI

For the sake of clarity, the sequence of events of MCI will be viewed separately, whilst in practice, they will probably overlap considerably. Three successive phases can be defined, the activation of the MCI plan, the implementation of the plan, and the mitigation phase during which the definitive resolution of the incident occurs. Because triage occurs in the implementation phase this article discusses primarily this phase.

The activation of the MCI plan is followed by its implementation. This includes the necessity to triage all victims to determine the priority with which they must be transported from the scene to the medical centre and the urgency of treatment they require. Triage also serves to "tag" fatally injured victims so that subsequently arriving rescuers do not waste time with resuscitation efforts at a time when their skills are required by other, salvageable, victims (2).

PRINCIPLES OF MANAGEMENT/ORGANISATION FOR MCI

Having defined what constitutes a multiple casualty incident and looked briefly at the various phases of management of such event, we should now take a more detailled look at those principles and considerations that the medical team at each event must take into account in formulating their own MCI plan; we will also emphasize what knowledge each member of the team should master in order to function efficiently in the case of activation of an MCI plan.

ROLE OF FIRST INTERVENTION TEAM

The first intervention team to arrive at an accident scene will usually not have been forewarned that an MCI situation exists.

The first team to intervene at any accident must always evaluate the situation before providing care for victims. This starts with an estimate, as precise as possible, of the number of victims, and communication of this number to race control.

If the threshold number of victims for activating the MCI plan is reached, the plan is activated by race control, after consultation with the Chief Medical Officer.

Once the MCI plan is activated, the role of the first team changes dramatically. This team is no longer used for actual medical care, but rather organizes the scene of the accident so that the subsequently arriving medical personnel can work efficiently. The tasks of this first team will be considered next.

ORGANISATION OF THE ACCIDENT SCENE

One of the members of the first team on-site (nurse, driver, etc.) should assess the scene to assist in determining the most efficient flow of INCOMING intervention teams, ambulances, and vehicles from race control, and OUTGOING ambulances, heading to the medical centre. If fuel leakage or other hazards are present, which could constitute potential dangers for OTHER groups, race control must be informed immediately, to allow the consideration of the possibility of moving those at risk.

PRINCIPLES OF INITIAL TRIAGE

The doctor in the first intervention team on-site must rapidly and efficiently examine each victim at the MCI scene in order to determine his or her triage category. This category serves to prioritise both the urgency of care rendered by subsequently arriving caregivers and also to determine the order with which the victims will be transported to the medical centre, or in some cases directly to hospital. Four plus one basic groups are discerned indicated by triage categories (I-IV) and often also by colours. These groups are the following:

I. (red): victims requiring immediate, lifesaving care but with reasonable chances of salvage;

II. (yellow): victims requiring medical care to preserve function but for whom care can be deferred for up to several hours;

III. (green): the ”walking wounded” for whom care can be delayed for longer;

IV. (blue): mortally wounded victims, beyond salvage;

The fifth category is: dead.

The most practical and easily learned procedure for this initial triage is the ”S.T.A.R.T.” system (Simple Triage and Rapid Treatment), which is a modification of the SALT Mass Casualty Triage Algorithm (Sort, Assess, Lifesaving Interventions, Treatment/Transport). The S.T.A.R.T. algorithm sequentially evaluates the ability of the patient to walk, followed by the respiratory, circulatory, and neurologic systems. The S.T.A.R.T. algorithm can be rapidly learned, is simple to apply, and has been field-tested. Furthermore, its application should take no more than 30 seconds to one minute per patient (3, 4, 5, 6, 7) (Figure 1 shows the sequence of evaluation that constitutes the S.T.A.R.T. system.)

PRACTICAL ASPECTS OF INITIAL TRIAGE

As the doctor of the first on-scene team proceeds with the triage, he leaves a record of his passage physically attached to each victim, regardless of the triage category. This is usually accomplished using cardboard tags attached with a string. Figure 2 and 3 shows one such type of tag, which is used in Hungary, and also on the Hungarian Grand Prix. Several details about these cards should be noted (3). Each tag is numbered, allowing identification of victims when names and addresses are not obtainable. These numbers are used during intake and evacuation registration at the medical centre, during transport and in the hospital. The bottom of the card consists of two tear-off strips printed with the same numbers; one of these corners can be torn off and kept at the medical centre when the patient is evacuated to a hospital while the other can be torn off and kept by the evacuating ambulance crew as a record of the patient’s transport. The cards also have room to note the name of the victim, if it is available, and for details of vital signs and treatments given. These are most useful once the patient is transferred to the hospital.

The first medical team on-site continues to supervise the ongoing care of the victims. As ambulances and other vehicles depart from the scene with victims being transferred to the medical centre, this team must continually assess whether added resources are necessary, i.e., whether same ambulances, having discharged patients at the medical centre, need to be re-directed to the scene. Similarly, race control (and the medical centre) should be worn of the requirement for more physicians, nurses, etc. at the scene (8).

The first medical team to arrive at the scene of a MCI will devote all their attention to organisational and triage duties. Only when these duties are fully accomplished can the first medical team begin to assist other teams present on-site in providing actual patient care?

ROLE OF SUBSEQUENT INTERVENTION TEAMS

As medical teams arrive at the scene, they will attend to victims according to the triage category assigned by the first doctor. Victims categorised as category IV or dead are not resuscitated, given the virtually 100% mortality

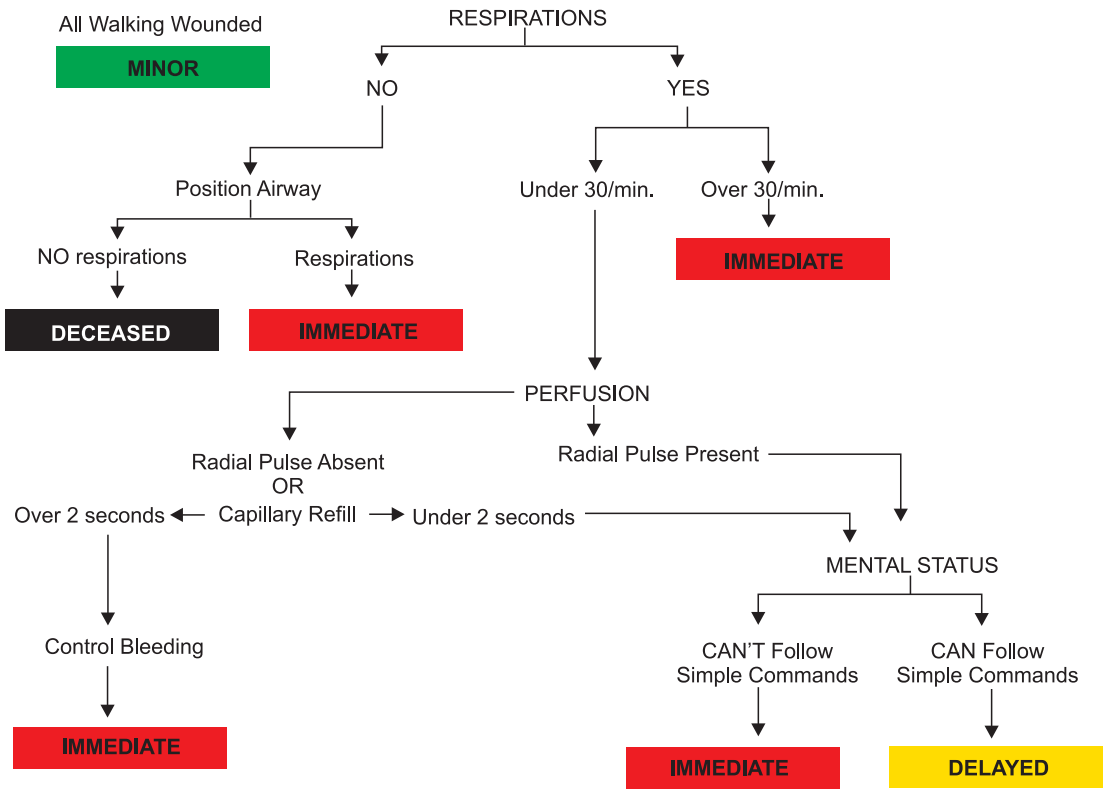

Fig. 1. The S.T.A.R.T. Triage system.

rate of traumatic cardiac arrests and the limited resources available to treat those with reasonable chances of survival. Category IV and dead victims are left in place, covered for discretion (by non-medical personnel, in order to let trained team members proceed with necessary work). Bodies will be moved only, if they hinder access to living victims or if they are threatened with destruction by fire.

The ”walking wounded” (triage category III) should be grouped and placed into vehicles for transport to the medical centre. Vans, such as those used for press shuttles or for the extrication teams, are perfectly adequate for the transport of victims in this category. No medicalisation is required for their transfer to the medical centre. To the extent possible, all these victims should be seen and evaluated in the medical centre.

Category II victims need minimal intervention at the scene and should be led to ambulances. For maximal efficiency, more than one victim can be transported per ambulance. Minimal on-site treatment is carried out. Splinting of fractures and dressing of wounds can be carried out during transport or, more appropriately, at the medical centre itself.

Category I victims (those who are in respiratory distress, in shock, with active bleeding, or are victims of head injury sufficient to render them unconscious) must be attended to first and such victims have priority for transport. They should be extricated from their vehicles expeditiously and only treatment necessary to avoid early death must be carried out prior to transfer to the medical centre (endotracheal intubation, iv. access, etc).

Medical teams arriving after the first team has assumed local command of the incident must emphasise efficiency and rapidity in their care of victims on-site. They attend to victims based on triage category. The usual pairing of “nurse working with a doctor” may be broken to allow maximum benefit for a maximum number of victims (9).

ORGANISATION OF THE MEDICAL CENTRE

Upon activation of the MCI plan, the medical centre must be reorganised in order to process the number of patients who will need to be managed in a short period of time, as well as to efficiently handle logistic and secretarial duties that are inevitably associated with MCI. This reorganisation need not be complex but must be discussed prior to a MCI and understood by the totality of the staff present. The following section of the present article examines the various aspects of the organisation of the medical centre during a MCI plan.

As victims are brought to the medical centre their identities (names, addresses, or simply the numbers of the corresponding triage tag) must be noted, as well as the time of arrival. The intake secretary is responsible for this task; this can most efficiently be accomplished by non-medical personnel posted adjacent to the intake area of the medical centre. Pre-printed forms should be prepared and they should be stored in an easily accessible area, ideally with all other required paperwork.

After intake registration, all incoming patients must be seen by a triage officer; this must be a physician,

preferably with some experience in MCI management and, at the very least, a firm knowledge of the principles of triage. This second round of triage serves several purposes. Any change in the patient's status from the initial, on-site triage is highlighted at this point. This second round of triage will determine the urgency with which evacuation to hospital must be carried out. Further, as will be seen below, the area of the medical centre to which each victim is taken, is also determined by triage category. The structure of the triage tag applied in Hungary allows the use of the triage tag also for this secondary round.

EDUCATION AND PRACTICE

In Hungary there exist a CEP (Chief Emergency Physician) training (22 hours) since 2004, and a two-semester course on the Semmelweis University Faculty of Health Sciences for paramedics since 2005. Both courses concentrate as well on the Triage procedure. The courses and trainings involve on-field praxis as table top presentation as well, and we have developed a PC program for practicing the Triage procedure.

We have a triage documentation (Triage tag) at the Hungarian Ambulance Service and also at the Hungaroring since 2007.

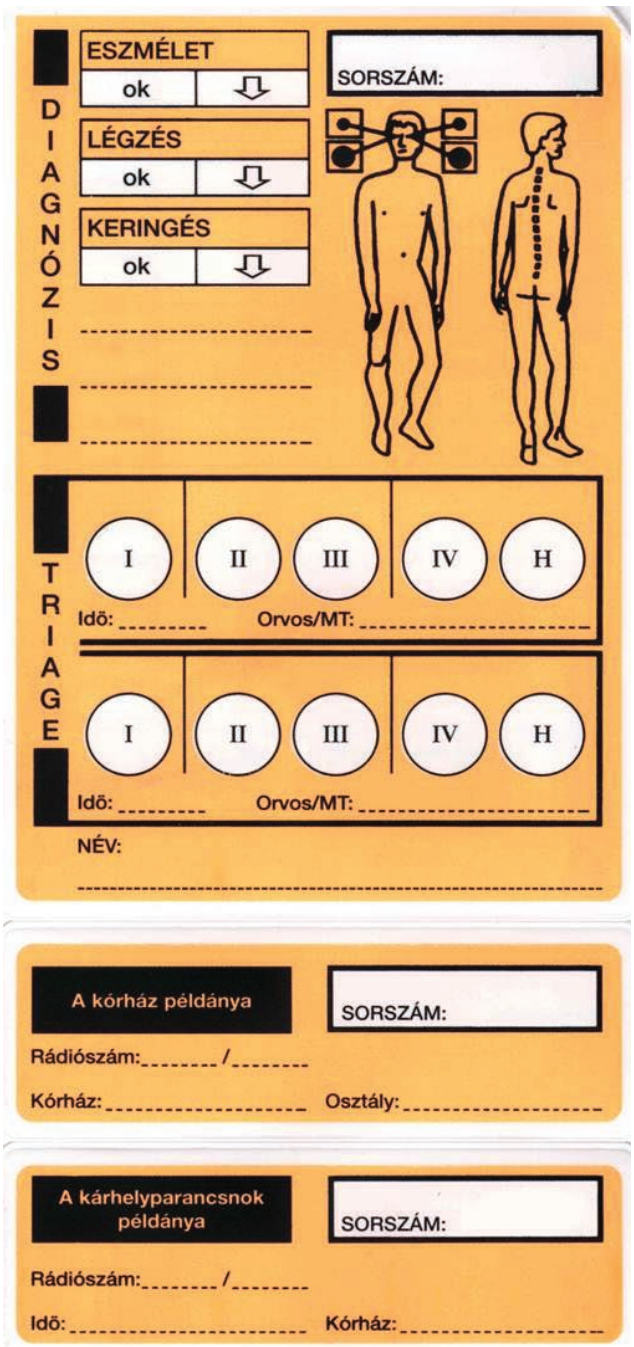

Fig. 2. The triage Tag used in Hungary (front side).

Fig. 3. The triage Tag used in Hungary (back side).

Table 1.

Date	Incident time	No° of victims	First doctor on scene	End of triage	Triage time	Last ambulance leaves the scene	Hit ratio (%)
10.08.2000.	14:51	22	14:54	15:38	44’	15:56	66%
28.07.2005.	18:22	22	18:24	18:42	18’	18:55	72%
29.07.2010.	17:45	22	17:46	17:59	13’	18:08	98%

On the Hungaroring we do exercises also for MCI regularly. In the study we have compared the triage time, the whole time at the scene (the last ambulance leaving the scene), and the accuracy of the triage (hit ratio) before and after the trainings, and using the triage tags. The results are presented in table 1.

RESULTS

Practicing with the same number of victims (and the same number of various triage categories) between 2000 and 2005, the triage time became shorter by 26 minutes and the whole elimination of the MCI by 31 minutes. After using a good triage tag system and additional training in 2010 the times are shorter by further 5 and 9 minutes (compared with 2000: 31 and 40 minutes). The hit ratio became 6% better between 2000 and 2005, and 26% between 2005 and 2010 after using the triage tags (compared with 2000 32%).

As we can see, the most effective tools for reducing triage and MCI elimination time are training and courses whereas triage documentations are not as effective, nevertheless, a good, triage documentation system well known by the team is important in the hit ratio improvement.

CONCLUSION

Modern motorsport environment provides a remarkable example of professionalism at every level. This extends also to the field of medical care which can be provided to victims of ”typical” accidents. The training of doctors and paramedics is very important in order to decrease the time spent on the scene and to allow a quick and appropriate primary and secondary survey for victims. Good triage documentation improves the hit ratio but it has no significant influence on the time spent on the scene. In order to make a paper plan function during a real MCI, it is obvious that each member of the team must understand the plan and team-members must acknowledge their roles and the way of their assuring. Real-time or ”table-top” exercises are extremely useful in validating and practicing the plan. □

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