Organization and Execution of On-site Health Care During Mass Participation Events

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Abstract:

On-site medical care should be considered essential for mass participation athletic events. Events such as road races, marathons, and triathlons may attract thousands of participants and spectators, which may overwhelm regional health care capabilities. One successful model of a mass participation event medical care system involves direction by a medical director or coordinator who is a physician and is ideally trained in emergency and/or sports medicine.

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The medical director or coordinator is charged with organizing a medical team to provide seamless care to participants and spectators from the starting line to the finish line using resources available in the surrounding community. This article provides clinicians with the information needed to organize and execute on-site medical care during mass participation events. Due to the complexities of mass participation events (eg, size of the event, logistical planning with the hosting community, and the medical personnel available to provide care), a generalized model for organizing medical care at these events will be presented.

Forming a Medical Committee

Considerable planning and preparation involving a race's medical director/coordinator, race directors, and representatives from the local medical community and public safety agencies is warranted in designing a comprehensive medical program that maximizes the care provided to

the participants and spectators. Such a committee should ideally include representatives from local hospitals, emergency medical service providers, the public safety sector, and other medical care providers such as athletic trainers, physical therapists, and other ancillary services providing supportive care. The medical committee is tasked with developing the policies and procedures for medical care provided on the day of the event, coordinating the distribution of medical care along the racecourse, and acquiring medical volunteers to provide care to runners and spectators for the duration of the event.

With the many moving parts associated with a mass participation event and the personnel involved with ensuring the event's success, the medical committee is also tasked with ensuring effective communication lines from all parties involved. A well-established line of communication is the most vital aspect of designing a well-run medical program and the medical director/coordinator must ensure that there is an open line of communication between all members of the medical team throughout the planning, preparation, and execution of the medical care at the event to avoid any lapses in patient care.

Figure 1. Representative members and corresponding roles and responsibilities of the sports medicine team that are recommended to be included when organizing and executing a medical program at a mass participation event.

Recruiting Medical Volunteers

Because the type of medical care at these events varies by location, time of year, and type of event, a multi-disciplinary team approach is the recommended model because it optimizes patient care by bringing together volunteers from various specialties and disciplines (Figure 1). A 2% to 3% casualty rate is expected during any mass participation event, and this rate may rise to between 5% and 8% during tough situations such as extreme environmental conditions, with

most casualties observed at the finish line medical tents.[1] For example, according to a conversation with Chris Troyanos (November 2016), the Boston Marathon has seen a casualty rate of 10% in years when it is abnormally warm. During the planning and preparation of each event, the medical committee must determine their specific surge capacity (ie, maximum number of patients expected at any given time during the event) and be appropriately staffed to attend patients in that capacity.

Recruitment of medical volunteers should include physicians with training in emergency and/or sports medicine, athletic trainers, nurses, physical therapists, and physician assistants. Non-licensed medical volunteers such as student athletic trainers, nursing students, and physical therapy students are other volunteers who can add to the capabilities of the medical volunteers (eg, finish line sweep, medical scribes, and medical records) and should be included if possible. Planning should account for the fact that some volunteers may not be able to attend the event.

Developing a Race Day Chain of Command

To streamline methods of communication on race day from the medical director/coordinator to the medical volunteers and vice versa, it is important that a chain of command be developed prior to the start of the day. For example, each medical tent at the Boston Marathon is organized into sections with distinct roles and responsibilities (Table 1) (Chris Troyanos, oral communication, November 2016). Each medical tent has a tent leader who oversees the flow of care in the tent and directly reports to the medical director/coordinator. Reporting to the tent leader is a designated individual overseeing the various health care professions within the tent, which simplifies the routing of the communication lines from both directions. The establishment of a chain of command similar to that seen at the Boston Marathon creates an effective method for relaying vital information during the course of the race.

Table 1. A Sample Organization of Stationary Medical Tents

Component	Purpose
Triage	Triage critical and non-critical patients to appropriate sections
	Aid with flow of patients through medical tent
Medical records	Record patient information on type of injury and treatment
	Coordinate with race officials for communication with family/friends
Security	Control people entering and leaving all entrances to medical tent
	Limit only authorized persons from accessing treatment areas
Treatment sections	Each section contains subsets of medical professionals (physicians, certified athletic trainers, physician assistants, physical therapists, and nurses) for patient care
	Allows for continuity of care for all participants
	Sections set up based on level of care needed (ie, intensive care unit, podiatry, or heat illness unit)

Distributing Medical Volunteers Along the Racecourse

Appropriate staffing and disbursement of the medical staff is needed to ensure that care is provided over the entire duration of the racecourse. Staging medical staff at the start of the race, throughout the racecourse, and at the pre-finish, finish, and post-finish lines ensures that all incidents are promptly recognized and treated. Furthermore, depending on the type and terrain of

the racecourse, the race and medical organizers must consider the access to care during the course of the race. For stationary medical locations along the racecourse, established protocols for receiving, treating, and discharging patients are needed to allow for the seamless care of patients (Table 1). Using available public safety assets equipped with basic and advanced life support or mobilizing medical staff on modes of transport such as a golf cart or bike may provide for expedient transport to the nearest stationary medical location.

Developing a Standardized Treatment Protocol

The types of medical care provided during any mass participation event can vary from basic first aid to caring for multiple patients in a mass casualty event.[2,3] In addition, the medical team must be prepared to triage and treat injuries ranging from musculoskeletal injuries, dermal injuries, and dehydration to potentially catastrophic injuries such as sudden cardiac arrest, exertional heat stroke, and exertional hyponatremia (Table 2).[1,4–6] When developing treatment protocols, it is prudent to mirror local emergency medical service protocols to ensure the continuity of care if transport to a local hospital is warranted. However, treatment protocols may supersede local emergency medical service protocols in routing patients to the nearest medical tent in lieu of the nearest hospital.

Table 2. Recommended Supplies and Special Considerations at Mass Participation Event Medical Tents

Type of Injury	Recommended Supplies	Special Considerations
Musculoskeletal injuries	Orthopedic braces Ambulatory aids	Assign volunteers who have medical training in orthopedic and sport injuries Likelihood of providing ambulatory aids is low (ie, if needed, the patient is likely to be referred to neighboring hospitals)
Dermal injuries	Wound care supplies (eg, gauze, bandages, and skin closures)	Establish a plan for discarding materials contaminated with blood prior to the race
Sudden cardiac arrest	Automated external defibrillator Electrocardiogram	Blood pressure cuff Pulse oximetry equipment Automated external defibrillator should be placed at the main medical tent by the finish area and be carried by mobile medical volunteers throughout the course
Exertional heat stroke	Rectal thermometer Cold water immersion tub (or other acceptable method of whole body cooling) Ice Water	Have a private area in the medical tent for rectal temperature measurement Establish a plan for discarding and replacing soiled immersion tub
Exertional hyponatremia	Salty foods High sodium soup broth Hypertonic saline intravenous fluid	For a longer distance race and/or slower paced race, establish a portable lab within the medical tent that is capable of measuring blood sodium level

An effective method for disseminating the policies and procedures to the entire sports medicine team is to hold a team meeting prior to the event, which outlines the chain of command at the race and reviews the established protocols so that all members across all disciplines are cognizant of their duties.

Acquiring Medical Supplies for Race Day

Various considerations such as the size, length, and time of year of the event and the environmental conditions that the participants may experience must be taken into account to ensure that sufficient supplies are on hand throughout the course of the event to appropriately treat any injury or illness that may arise. The medical director/coordinator must work with the medical committee during the planning phase to develop a plan for the purchase, storage, and disbursement of medical supplies along the racecourse to prevent any potential shortages in supplies. If a shortage does occur, a plan must be in place to re-route supplies or have an auxiliary plan to replace the purged supplies during the race.

Maintaining Accurate Medical Records

Maintaining accurate medical records of treated participants during the race is vital for the patient's continuation of care. Although this can take many forms (eg, paper-based or electronic medical records), it must be stressed that medical records must be filled out completely to optimize care and make informed medical decisions. Following the event, the medical director/coordinator and medical committee should assess the medical records to evaluate the organization and efficiency of the on-site medical care to develop data-driven management decisions for future event planning.

Conclusion

Evidence-based point of care services at a mass participation event should be implemented by a multi-disciplinary team of medical professionals. Developing event-specific medical protocols for all potential injuries and the coordination of volunteers will optimize the care provided to participants. In this way, appropriate care can be administered on-site, without overwhelming local health care resources.

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