Practical guidance for In-Hospital Preparation on Operating Room management for Mass Casualty Incidents

The Olympic and Paralympic Games MCI Committee,
Japanese Society of Anesthesiologists

Contents

Summary

To prepare for the Tokyo Olympic and Paralympic Games in the summer of 2020, the Japanese Society of Anesthesiologists (JSA) joined the Academic Consortium on Emergency Medical Service and Disaster Medical Response Plan during the Tokyo Olympic and Paralympic Games in 2020, consisted of 27 academic societies, and launched the Olympic and Paralympic Games MCI Committee to draft this practical guidance for hospitals on preparing for mass casualty incidents. This guidance lists recommendations from the references published by academic organizations at many countries as well as proposals from the committee based on the Japanese healthcare environments and social infrastructure. Key points and checklists are summarized into six sections: 1) Establish a chain of command and create a plan, 2) In-hospital cooperation and preparation for medical demand surge, 3) Space, 4) Staff, 5) Stuff, 6) Ethical considerations, and each section includes the suggestion of leaders and persons to be involved by each item. We created this guidance to help anesthesiologists address mass casualty incidents (MCIs), focusing on safe and efficient management of operating rooms as well as the entire hospital.

Preface

This is the revised English version of the practical guidance developed by The Olympic and Paralympic Games MCI Committee of the Japanese Society of Anesthesiologists.

Introduction

Japan has experienced many mass casualty incidents (MCIs) caused by multiple events including a sarin gas attack on the Tokyo subway system, a train derailment accident on the JR Fukuchiyama Line, and a mass murder at a facility for the disabled in Sagamihara and natural disasters occurring at multiple areas. Although the Disaster Medical Assistance Team (DMAT), launched in 2005, has achieved some positive results in Japan, our social infrastructure and medical facilities are not well prepared for MCIs such as acts of terrorism or riots compared with those in the United States and European countries. To prepare for the Tokyo Olympic and Paralympic Games originally scheduled in the summer of 2020, the Academic Consortium on Emergency Medical Service and Disaster Medical Response Plan during the Tokyo Olympic and Paralympic Games in 2020 (http://2020ac.com/) was launched in May 2016. The Japanese Society of Anesthesiologists (JSA) joined the consortium as the 23rd member in October 2018 and organized the Olympic and Paralympic Games MCI Committee (the MCI committee). We see the Olympic and Paralympic Games as an important opportunity for medical facilities to prepare for MCIs that may occur as a consequence of any events. Thus, we drafted this guidance to help anesthesiologists address MCIs, focusing on safe and efficient management of operating rooms as well as the entire hospital.

This guidance is intended to focus on MCIs, but not intended to address cases where public utilities or medical facilities are damaged due to large-scale natural disaster. This guidance lists recommendations referred to the literature and guidelines published by academic organizations of various countries as well as proposals from the committee members. The proposals are based on the Japanese healthcare environments and social infrastructure, which may be somewhat different from those in other countries. Each chapter is composed of “Points to be addressed during MCIs : Recommendations and proposals” and “MCI preparation checklist” so that the guidance can be universally used even though the scale, community characteristics, and clinical practices vary by medical facility. If any position listed in the guidance do not exist in your facility, a person who is equivalent may hold the position and most of the case, anesthesiologists can act as a potential operating room (OR) manager.

Although the Tokyo Olympic and Paralympic Games were postponed until the summer of 2021, we believe that this guidance is valuable to prepare MCIs or the infection disaster such as Coronavirus disease 2019 (COVID-19) pandemics. We hope that this guidance can help anesthesiologists contribute to their medical facilities and their local communities. MCIs are matters not only for major hospitals!

1. Establish a chain of command and create a plan

(1) Points to be addressed during an MCI: Recommendations and Proposals

- An operating room (OR) manager and anesthesiologists should be involved in the in-hospital emergency headquarter.
- Several sets of surgery teams consisting of various professionals should be formed in case of surge in demand.
- Medical staffing shall be increased according to the guidelines for OR use during MCIs.
- Hospital should closely cooperate with other facilities in the community to address an MCI, including coordinating the transport of patients and blood products.

(2) MCI preparation checklist

No.	Activities during MCI	Preparation for MCI	Leader	Persons involved	Completion
1	Each department works effectively.	Establish institutional MCI guidelines. Confirm and simulate a chain of command based on the guidelines.	Hospital director	Chiefs of clinical department; Nursing director; Hospital administration head	☐
2	Operating rooms function systematically and effectively.	Establish and periodically review the operating manual for OR during MCI. Participate in the in-hospital emergency headquarter.	OR manager	OR management committee	☐
3	Cooperate with other facilities in the community.	Create a list of partner facilities in the community. Hold meetings with partner facilities periodically to discuss methods and areas for cooperation.	Hospital director	Nursing director; Hospital administration head	☐

2. In-hospital cooperation and preparation for medical demand surge

(1) Points to be addressed during an MCI: Recommendations and Proposals

- Information on the location and characteristics of an MCI shall be shared with relevant administrative organizations and neighboring medical facilities.
- Manpower should be reserved to perform triage for emergency surgeries.
- OR manager shall determine whether to postpone scheduled elective surgeries and secure ORs and staff to deal with MCI related events.
- OR manager shall determine whether it is necessary to isolate patients to prevent exposures or contaminations with unknown substances.
- If needed, OR manager should consider transferring patients to neighboring facilities in the community appropriately based on the patients' and facility's characteristics.

* Surge capacity means the capacity to implement appropriate medical activities with limited medical resources when there is a surge in the number of patients.

* Although the principle of disaster medical care is to act based on accurate information, it is unlikely that accurate information could be obtained during the initial stage of an MCI.

(2) MCI preparation checklist

No.	Activities during MCI	Preparation for MCI	Leader	Persons involved	Completion
1	Estimate the demand for ORs and execute plans in the operating manual for OR during MCI.	Confirm the means to share information with relevant administrative organizations and emergency department (ER). Develop partnerships with neighboring facilities.	OR manager	OR management committee; Chiefs of clinical department	☐
2	Share information on the situation at the MCI site and ER. Organize the teams for emergency surgeries.	Specify how to secure space, staff, and stuff according to a scale of the facility in the operating manual for OR during MCI. Conduct simulations.	OR manager	OR management committee; Chiefs of clinical department	☐
3	Perform triage for emergency surgeries.	Include plans of triage for emergency surgeries into the operating manual for OR during MCI.	OR manager	OR management committee; Chiefs of clinical department	☐
4	Secure OR staff and share information with them.	Specify the way to secure manpower and to evaluate patients' characteristics in the operating manual for OR during MCI. Conduct simulations.	OR manager	OR management committee; Chiefs of clinical department	☐

3. Space

(1) Points to be addressed during an MCI: Recommendations and Proposals

- ORs shall be secured for emergency surgeries.
- The patient flow from entry into the hospital, entry into the OR, exit from the OR and entry into the ward should be unidirectional.
- Transport and admission rooms shall be secured for patients undergoing surgeries or staying in the post-anesthesia care unit (PACU).
- The number of available ORs should be reported periodically to the emergency headquarter.
- Use of a part of ORs and PACU as beds for intensive care unit (ICU) shall be considered.

(2) MCI preparation checklist

No.	Activities during MCI	Preparation for MCI	Leader	Persons involved	Completion
1	Confirm which ORs and PACU beds are occupied.	Create action cards for each role. Specify the communication pathway.	OR manager	OR management committee	☐
2	Establish unidirectional patient flow.	Specify the patient flow and the transport procedures, including designated persons for transport, in the operating manual for OR. Conduct simulations.	OR manager	OR management committee	☐
3	Find ward or ICU beds for patients undergoing surgeries or staying in PACU.	Confirm the availability of ward beds. Designate responsible persons for patient transport during MCI in the operating manual for OR. Conduct simulations.	OR manager	OR management committee: Nursing department	☐
4	Confirm the number of available ORs.	Develop protocol of periodic report to the emergency headquarter about the information on available ORs.	OR manager	OR management committee	☐
5	Determine whether to postpone scheduled elective surgeries.	Develop and disseminate the criteria to postpone elective surgeries during MCI.	OR manager	OR management committee	☐
6	Confirm ORs and PACU beds to be converted to ICU beds. Check the availability of equipment for the conversion.	Develop the operating manual for ORs and PACU beds to convert to ICU beds. Conduct simulations.	OR manager	ICU physicians; Nursing department	☐

4. Staff

(1) Points to be addressed during an MCI: Recommendations and Proposals

- The hospital director shall declare an MCI emergency.
- Trauma and emergency surgery response teams should be formed.
- Each profession or department should establish the means to assemble staff in an emergency.
- ER, ICU, and OR should closely cooperate with each other.
- Assign staff to take care of patients who need assistance.
- If overstaffed, the leaders should send off some of the members and make them on call.
- Staff should work in shifts to prevent overwork and attention should be paid to enable staff to rest.
- A system should be established to record and share medical records during MCI.

(2) MCI preparation checklist

No.	Activities during MCI	Preparation for MCI	Leader	Persons involved	Completion
1	Hospital director declares an MCI emergency.	Develop the institutional MCI guidelines.	Hospital director	Safety committee; Hospital staff	☐
2	Prepare the means to assemble staff.	Develop contact lists for each profession or department. Conduct simulations.	Hospital director	Chiefs of clinical department; Nursing director; Hospital administration head	☐
3	Form trauma and emergency surgery response teams.	Conduct training on damage control surgery*. Create action cards for each role.	OR manager	Chiefs of clinical department; Nursing department; Hospital administration	☐
4	Efficiently conduct activities with full cooperation of the OR staff.	Specify the chain of command and communication pathway in the operating manual for OR during MCIs.	OR manager	Chiefs of clinical department; Nursing department; Hospital administration	☐
5	Ensure cooperation with ER and ICU.	Create action cards for each role. Specify allocation of staff in the operating manual. Conduct simulations. Visualize the availability of equipment.	OR manager	Chiefs of clinical department; Nursing department	☐
6	Assign staff to take care of patients who need assistance.	Develop the institutional MCI guidelines. Conduct simulations.	Hospital director	Chiefs of clinical department; Nursing department	☐
7	Clean ORs after surgeries with massive bleeding.	Allocate cleaning personnel. Simulate cleaning operations.	Nursing director	Infection control department	☐

* Damage control surgery is one of the treatment strategies of trauma to save lives. It is performed to achieve primary hemostasis and stabilize hemodynamics before the trauma triad of death (i.e. metabolic acidosis, coagulopathy, and hypothermia) develops.

5. Stuff

(1) Points to be addressed during an MCI: Recommendations and Proposals

- Information on type and scale of MCI shall be shared with the emergency headquarter.
- The number of available ORs should be confirmed. A sufficient number of ORs for emergency surgeries should be secured.
- The number of patients acceptable for the hospital should be estimated based on available resources including medical supplies, devices, drugs, and blood products required for damage control surgeries.
- When medical supplies, devices, drugs and blood products are not sufficiently available, procurement requests shall be made to the emergency headquarter.

(2) MCI preparation checklist

No.	Activities during MCI	Preparation for MCI	Leader	Persons involved	Completion
1	Confirm the number of available ORs.		OR manager	OR management committee	☐
2	Check the availability of medical supplies and devices required for surgery and anesthesia.	Specify a procedure for procuring medical supplies, including sterilization, in the operating manual for OR during MCI. Conduct simulations. Pack surgical equipment for damage control surgery in kits.	OR manager	Medical supply department	☐
3	Check the availability of blood products for each blood type.	Confirm the system of blood ordering and the cooperation with neighboring facilities. Conduct simulations.	Transfusion department manager	Transfusion department; Clinical laboratory	☐
4	Prepare ORs for the conversion to ICU beds.	Simulate allocation of resources including medical equipment and personnel.	OR manager	ICU physicians	☐

6. Ethical considerations

(1) Points to be addressed during an MCI: Recommendations and Proposals

- If the consent cannot be obtained from the patient and family members, two or more healthcare professionals shall admit that the treatment is critical to sustain the patient's life.
- Hospital staff shall understand the concept of "the greatest good for the greatest number" in disaster medical care under limited medical resources and pay attention to people directly affected by the disaster.
- Medical records shall be completed without delay after emergency medical care.
- In communication of information, ethical aspects including the protection of personal information shall be considered sufficiently.
- Palliative care for agonal patients as well as mental support for families of victims and agonal patients should be considered.
- Attention should be paid to the mental condition of medical staff.

(2) MCI preparation checklist

No.	Activities during MCI	Preparation for MCI	Leader	Persons involved	Completion
1	Allocate medical resources appropriately.	Develop priority criteria for resource allocation complying with relevant laws and regulations.	OR manager	OR management committee; External expert	☐
2	Perform triage and patient isolation based on clearly specified criteria.	Develop triage criteria for emergency surgeries and isolation criteria for patients.	OR manager	OR management committee; External expert	☐
3	Consider ethics in communication of information.	Specify content, timing, and method for information release.	Hospital director	Public relations department	☐
4	Obtain informed consent for surgery, anesthesia, blood transfusion, and invasive procedures.	Develop the manual for obtaining informed consent. Conduct simulations.	OR manager	Safety committee	☐
5	Consider palliative care for agonal patients and mental support for families of victims and agonal patients.	Develop the manual for palliative care to critical patients and mental support to their families.	Nursing director	Palliative care team; Psychiatrist	☐
6	Provide mental support to medical staff.	Develop the standard of working conditions during emergencies. Establish mental support system for staff.	Hospital director	Human resources manager	☐

Appendix

Table 1. Key points of related knowledge about MCIs

1	Change thought process into “the greatest happiness of the greatest number”
2	Consider the imbalance between the number of people to be treated and the capacity of medical resources
3	Surging victims to the institution near MCI, “immediately” and “massively”
4	Many surgery-required traumas in extremities, brain, and abdomen
5	Many transfusion-required cases (Tourniquet removal should be conducted in OR)
6	Various kind of disasters (trauma, burn, poisoning, blast and gunshot)

Table 2. 4S to be secured by each institution

1	Stuff (Physical resources)
2	Staff (Human Resources)
3	Space
4	System

Table 3. What anesthesiologists show do to prepare for MCIs

1	Close in-hospital communication
2	Prioritization of surgeries and close cooperation with other departments
3	Participation in medical care outside of OR
4	Simulation training beforehand

References

1 Guidance for Intensive Care Units (ICUs) to Prepare for and Respond to Disasters, First Edition (2018). Crisis Management Committee of the Japanese Society of Intensive Care Medicine (in Japanese)
Available at: http://2020ac.com/documents/ac/04/5/4/2020AC_JSICM_ICU_20181105.pdf
Accessed: April 29,2020

2 Farmer JC, Wax R, and Baldisseri MR. Preparing your ICU for disaster response. Society of Critical Care Med. 2012
Available at: https://store.sccm.org/detail.aspx?id=EPREPARE
Accessed: April 29,2020

3 Hick JL, Christian MD, Sprung CL. Chapter 2. Surge capacity and infrastructure considerations for mass critical care. Intensive Care Med. 2010;36(Suppl1):S11-S20.

4 Aylwin CJ, König TC, Brennan NW et al. Reduction in critical mortality in urban mass casualty incidents: analysis of triage, surge, and resource use after the London bombings on July 7, 2005. Lancet. 2006;368:2219-2225.

5 Alfici R, Ashkenazi I, and Kessel B. Management of victims in a mass casualty incident caused by a terrorist bombing: Treatment algorithms for stable, unstable, and in extremis victims. Military Medicine 2006;171(12):1155-1162.

6 The Centers for Disease Control and Prevention. Blast Injuries: Fact Sheets for Professionals.
Available at: https://stacks.cdc.gov/view/cdc/21571
Accessed: April 29,2020

7 American College of Emergency Physicians. Bombings: Injury Patterns and Care. Blast Injuries: Fact Sheets for Professionals by Centers for Disease Control & Prevention.
Available at: https://www.acep.org/blastinjury/#sm00001hlkgl9nydrytc81v5u8a2qz2
Accessed: April 29,2020

8 Special Research Project Supported by the Ministry of Health, Labour and Welfare – Study for Developing Emergency and Disaster Medical Care Systems in Preparation for the 2020 Tokyo Olympic and Paralympic Games. Clinical Practice Guidance for Gunshot and Blast Injuries.
Available at: http://2020ac.com/documents/ac/04/2/1/2020AC_JAST_gun01_20180920.pdf
Accessed: April 29,2020

9 American Society of Anesthesiologists Committee on Trauma and Emergency Preparedness (ASA COTEP): OR Mass Casualty Checklist.
Available at: https://www.asahq.org/about-asa/governance-and-committees/asa-committees/-/media/87b5b2a86ed74e3b8567afe5bb125c7e.ashx
Accessed: April 29,2020

10 Mangunta VR, Patel D. The era of mass casualty events: Perspectives on care paradigms from a critical care anesthesiologist. Missouri Medicine 2019;116(1):49-52.

11 Davidson SL, Dutton RP. Lessons Learned From a Mass Casualty Incident. ASA Monitor 2018,Vol.82,8-11.

12 Morimura N. In-hospital Medical Response to Mass Casualty Incidents: Lessons Learned from Guidelines and Experiences Overseas. The Journal of Japan Society for Clinical Anesthesia, Vol. 39 No.3, 2019. (in Japanese)

13 American Society of Anesthesiologists Committee on Trauma and Emergency Preparedness operation room procedures for mass casualty.
Available at: https://www.asahq.org/in-the-spotlight/trauma-and-emergency-preparedness
Accessed: April 29,2020

14 Holcomb JB, del Junco DJ, Fox EE, et al. The prospective, observational, multicenter, major trauma transfusion (PROMMTT) study: comparative effectiveness of a time-varying treatment with competing risks. JAMA Surg 2013;148:127-136.

15 Holcomb JB, Tilley BC, Baraniuk S, et al. Transfusion of plasma, platelets, and red blood cells in a 1:1:1 vs a 1:1:2 ratio and mortality in patients with severe trauma: the PROPPR randomized clinical trial. JAMA 2015; 313:471-482.

16 Giesecke NM. Our role in mass casualty incidents, and an apology. ASA Monitor2018;82(9),4-5.

17 Kuza C and McIsaac J. Roles of the anesthesiologist during mass casualty event. ASA Monitor.2017;81(4):14-17.

18 World Medical Association Medical Ethics Manual Third Edition. - Japanese Version (Translated by N. Higuchi et al.). Japan Medical Association, 2016.(in Japanese)
Available at: http://dl.med.or.jp/dl-med/wma/mem/wma_mem_all.pdf
Accessed: April 29,2020

19 Major Incident Medical Management and Support: The Practical Approach in the Hospital. Advanced Life Support Group. - Japanese Version. (in Japanese) MIMMS Japan (ed.). Nagai Shoten Co., Ltd. 2009.

20 Murray MJ. Emergency preparedness for and disaster management of casualties from natural disasters and chemical, biologic, radiologic, nuclear, and high-yield explosive (CBRNE) events. In: Barash PG, ed. Clinical Anesthesia. 7th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2013:1535-1549.

21 Gregory J, de Lepinau J, de Buyer A, et al. The impact of the Paris terrorist attacks on the mental health of resident physicians. BMC Psychiatry 2019;19:79.

22 Mikhail J. The trauma triad of death: hypothermia, acidosis, and coagulopathy. AACN Clin Issues. 1999 Feb;10(1):85-94.