

Chapter 3

Project Activities

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Chapter 3

Project Activities

1. Personnel exchange programme of key project members

To further extend the cooperation between the All India Institute of Medical Sciences (AIIMS) and Osaka City University in the past 10 years, and to enhance understanding of trauma care situation in India and Japan, AIIMS and the joint association of Japanese Association for Acute Medicine (JAAM) and Japanese Association for the Surgery of Trauma (JAST) have agreed to exchange surgeons and related experts with each other. The Japanese associations dispatched doctors and related staff to the AIIMS, while the AIIMS dispatched doctors and nurses to Japan (See Appendixes A and B).

This project provided opportunities for surgeons from India and Japan to interact actively, determine barriers, and identify potential areas for cooperation. Japanese surgeons gained experience in surgery and learned medical skills needed to cope with the demands of trauma care in India. Indian surgeons were exposed to new methods of strengthening training systems and the fundamentals of a team approach in trauma care.

To consolidate the human network and ensure active communication, the joint association assigned the surgeons at Osaka City University to the role of project leaders. Osaka City University's surgeons have collaborated with the AIIMS in the past and are ready to coordinate and lead this programme. Signing up of a memorandum of understanding between the two parties on 17 March 2019 was the starting point of these series of the programme.

2. Activities of Japanese Trauma Surgeons in India

The programme's participants from Japan were selected through an open call to members of the JAAM and JAST (see Appendix C). Joint committee members of JAAM and JAST then selected six doctors who were divided into two groups. Both groups stayed at AIIMS for about two months and participated in trauma treatment practice there.

2.1. Report from the 1st group

Table 3.1 shows the weekly schedule of the Trauma Surgery Department at Jai Prakash Narayan Apex Trauma Center (JPNATC) of AIIMS. During this time, the Japanese trauma surgeons had many opportunities to join emergency operations day after day besides daily case study conferences and clinical rounds.

Table 3.1. Weekly Schedule of the 1st Group

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
AM	Conference	Conference	Round	Conference	Round	Round	Round
	Round	Round	Operation	Round	Operation	Operation	Operation
	Operation	Operation		Operation			
PM	Operation	Operation	Operation	Operation	Operation	Operation	Operation

Source: Authors.

Japanese surgeons were assigned to one of two teams of surgeons at JPNATC. As trauma surgeries are conducted at any given time of the day, the Japanese surgeons joined the team's social media group so that they could be informed of surgeries and participate in emergency operations even at night.

At JPNATC, trauma operations are performed on both hemodynamically stable and unstable patients. Japanese surgeons were involved with both types of cases. They found significant differences between that the therapeutic approach for hemodynamically unstable patients at AIIMS and at their home institutions in Japan. The pros and cons of the approaches of both countries are described in the two cases studies below.

Case 1

A 28-year-old male patient was presented to the AIIMS trauma centre after he was stabbed in his abdomen with a relative's knife. His blood pressure was unmeasurable, his hands and feet were cold, and his pulses were weak. Focused assessment with sonography for trauma (FAST) revealed massive fluid in the hepatorenal, splenorenal, and suprapubic recesses. Because he was hemodynamically unstable, he was immediately transported to the operating room for emergency laparotomy.

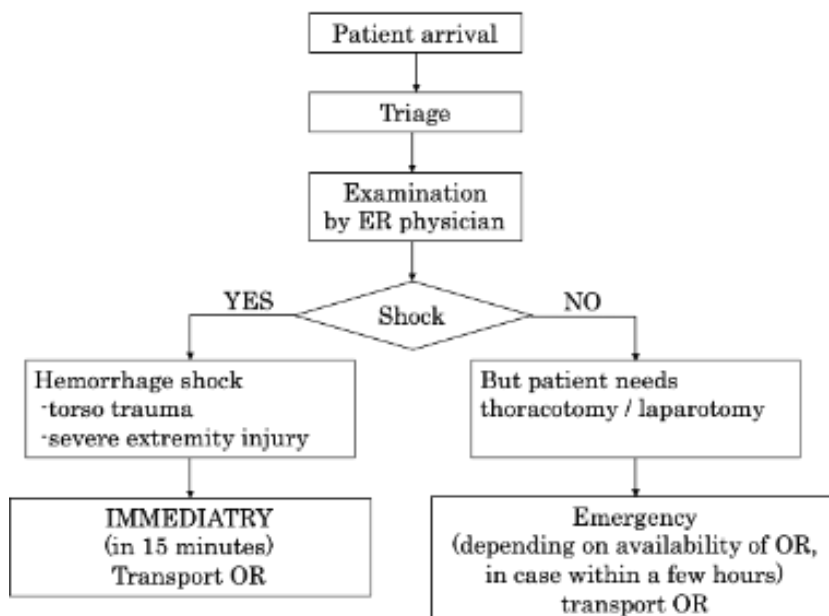
An emergency laparotomy was performed for massive intraperitoneal haemorrhage. The bleeding was from the injured common iliac artery and inferior vena cava. Those injuries were repaired, and the operation terminated as damages of vessels were controlled. After the surgery, the patient was treated in the intensive care unit. Open abdomen management was performed for about one month, after which the patient was discharged to his home.

Case 2

A 28-year-old-male was presented to the trauma centre after a traffic accident. His blood pressure was 70/40mmHg and his heart rate was 140 beats per minute, indicating that he was hemodynamically unstable. Resuscitation was started in the emergency department immediately, and a pelvic x-ray revealed unstable pelvic fractures. He was transported to the operating room for emergency laparotomy. A bilateral internal iliac artery was ligated, and gauze packing was done as damage control for the massive retroperitoneal hematoma.

The key to the success in case 1 was quick transportation to the operating room. The initial management algorithm in the emergency room at JPNATC is shown in Figure 3.1.

Figure 3.1. Algorithm of Initial Management at JPNATC



JPNATC = Jai Prakash Narayan Apex Trauma Centre; OR = odds ratio.

Source: Data collected at the Division of Trauma Surgery and Critical Care, Jai Prakash Narayan Apex Trauma Centre, All India Institute of Medical Sciences.

At JPNATC, a system for severe thoracoabdominal or extremities trauma has been designed for the treatment of patients who are in shock and are transported to operating rooms immediately. Once a surgeon decides to start emergency surgery, anaesthesiologists and nurses work together in order for this to happen. The time it takes to enter the operating room is always measured and strictly verified during case conferences. This is impressive for Japanese surgeons. In many of Japan's hospitals, it is hard to start an operation within 15 minutes after a patient's arrival because of fully scheduled elective surgeries and operative theatres, and because of a shortage in emergency surgical staff. Most hospitals in Japan are unable to keep one operation room open for trauma or emergency cases. In some hospitals, emergency thoracotomy or laparotomy are performed in emergency rooms. From the point of view of Japan's surgeons, rapid transportation to operation rooms is one of the outstanding features of India's trauma care system.

As for case 2, had it occurred in Japan, Japanese surgeons would have likely employed a hemostatic technique called transcatheter arterial embolisation (TAE). However, in India, the TAE procedure is not conducted on patients in shock regardless of the injury.⁴ Since TAE is a less invasive technique with fewer complications, it may be worthwhile to promote its use in India. Japan's surgeons are experienced in endovascular treatment and in the concept of damage control interventional radiology. The exchange of human resources through this project may increase awareness and understanding of such treatment amongst Indian surgeons and increase the range of options available to them.

Meanwhile, the prehospital system in India has significant problems. For example, there are no triage systems so a severely injured patient must be transported to regional hospitals which also lack sufficient resources to treat trauma patients. Furthermore, families or friends often have to bring patients in severe condition (e.g. head injury) to a hospital themselves. This causes serious delays in the timely delivery of acute care. Thus it seems the development of a prehospital ambulance system to optimise medical resources and decrease disability and death is urgently needed in India. Japan's prehospital system, including ambulance and triage services, is comprehensive and well-developed. Japan may then be able to contribute significantly to establishing a prehospital emergency system in India.

⁴ Non-invasive laparotomy is commonly available in the most medical facilities in Japan because of the availability of equipment such as CT and TAE-relevant modalities. Such equipment is less accessible in India so open surgery has become the preferred option.

Japan's surgeons joined over 100 trauma operations in 2 months. Although penetrating injuries (e.g. stab and gunshot wounds) are rare in Japan, Japan's surgeons experienced 14 penetrating injury cases in the same period. Still, the number of trauma surgeries conducted in India is much higher than in Japan. Trauma surgery experience possessed by surgeons at JPNATC is simply unobtainable for surgeons in Japan. India's trauma surgeons could therefore contribute greatly to strengthening trauma treatments in Japan.

At AIIMS, each individual trauma surgeon is highly capable and skilled in various surgical techniques; their excellent performance is evident in the quality of surgeries conducted. However, there is potential for growth such as by enhancing leadership and team management. The importance of a team approach has in fact gained much attention in Japan recently. There is increased recognition that not only technical skills but also non-technical skills should be honed, especially in trauma care. Thus, training courses such as the Surgical Strategy and Tactics for Trauma (SSTT) course are developed and provided for surgeons and nurses. The purpose of these courses is to build a team and to train personnel on how to manage severe trauma patients in an emergency or operating room as a team. Teamwork techniques are employed in different industries but are especially important in healthcare settings where patients' lives and wellbeing are at stake. From this perspective, the participation of Japanese surgeons in trauma care at AIIMS through this project could also contribute to the level of trauma care in India.

2.2. Report from the 2nd group

The Japanese surgeons in the second group stayed at JPNATC for a month and a half during which they were involved with more than two hundred operative cases and 1,300–1,500 trauma patients per week. They also witnessed five gunshot victims, including non-surgical cases. These patients were remarkably well managed. Management included the initial assessment and resuscitation at the emergency department and the activation of a surgical team in the operation theatre. In discussions between AIIMS surgeons and Japanese surgeons, it was pointed out that the availability of operation theatres and computed tomography (CT) scans is the most significant difference. The availability of the operation theatres is much higher at AIIMS than in Japan, whereas CT scans is almost inaccessible for trauma patients in India because of the large number of CT examination requests from all hospital departments.

The following is one of the cases during the second group's stay at JPNATC. A male patient in his thirties who was shot in the back was taken to the AIIMS trauma centre by a relative. The patient was in a state of shock. A triage officer decided that the patient was

hemodynamically unstable. Trauma surgeons then started initial resuscitation. As the operation proceeded, Focused Assessment with Sonography for Trauma (FAST) revealed that the patient's condition was a pericardial tamponade. Then the patient was shifted to the operation theatre, and an emergency thoracotomy was conducted. The length of time between arrival and thoracotomy was only 16 minutes.

The findings and lessons learned by the second group of Japanese surgeons is as follows:

a. Team cooperation

It is vital to develop a good relationship and maintain communication between trauma experts and the anaesthesiology team in the operation theatre to ensure that emergency operations are performed well. Japan's trauma experts can learn from the excellent teamwork at JPNATC including the flow of initial assessment, resuscitation, operation, intensive care, re-operation, ward management, and so on. Japan's surgeons, anaesthesiologists, and nurses are encouraged to maximise their participation in this programme and contribute to improving trauma treatment in Japan through a strong partnership with the AIIMS.

b. Techniques in trauma surgery

Experience treating vascular injury is essential for the trauma surgeons because quickly repairing vascular damage to restore blood flow through or around blocked arteries (known as reperfusion) is critical for trauma surgery. Compared to trauma surgeons in Japan, trauma surgeons in India are required to cover a wide range of operations including treatment of vascular injuries. Japan's trauma surgeons rarely have opportunities to treat, especially in the field of vascular and limb injuries.

c. Transcatheter arterial embolisation

Transcatheter arterial embolisation (TAE) is a haemostatic procedure widely used by the trauma surgeons in Japan. It does not require open surgery and is therefore less invasive, it is appropriate for either hemodynamically stable or unstable patients, and likely decreases morbidity and improves trauma care outcomes. Currently, it is rarely used at JPNATC. Increased exchanges in treatment experience related to interventional radiology techniques such as TAE could thus contribute to improving trauma management in India.

d. Older patients

Japan is the most aged country in the world and Japan's trauma surgeons are highly experienced in treating older trauma patients. India's trauma surgeons could thus benefit from Japanese surgeons' knowledge of patient management and medical therapy related to older trauma patients.

e. Training for trauma surgeons at JPNATC

In both India and Japan, trauma surgeons conduct daily clinical rounds, weekly case presentations, and semi-weekly surgical and radiology conferences. However, especially in India, the training curriculum for trauma surgeons is designed and created in trauma centres. Trauma surgeon residents rotate through neurosurgery, orthopaedics, cardiovascular surgery, and plastic surgery so they gain practical and well-rounded knowledge and skills. The treatment of trauma patients in emergency departments begins with an initial assessment and resuscitation. Job rotation experience at emergency departments is mandatory for the trauma surgery residents. This clinical training system and its curriculum at JPNATC provide excellent opportunities for trauma surgeons to acquire experience in managing trauma patients from start to finish and in a wide variety of cases.

f. Equipment

Shock is a critical condition brought on by a sudden drop in blood flow through the body. Shock may result from trauma, heatstroke, blood loss, an allergic reaction, severe infection, poisoning, severe burns, or other causes. When a trauma patient is in shock, surgeons need to check the physical condition of trauma patients in a limited amount of time.

CT scans can greatly facilitate quick examinations and potentially reduce the number of invasive therapies using precise information on the patient's condition. In Japan, some hospitals place a CT scan machine in their emergency room (ER) called a hybrid ER system and in their operation theatre (OT) called a hybrid OT system. In India, trauma surgeons have to deal with many trauma cases in the emergency department within a short period of time but CT scans are not readily available. It may be challenging to place CT scan machines in the emergency department in India at the moment, but it will probably be possible in the future.

If trauma centres in India were to have CT scan machines in their OT, a variety of non-surgical management techniques, including interventional radiology and TAE, would be available and contribute significantly to trauma treatment in the country. By utilising a hybrid OT system, surgeons would be able to conduct surgical procedures and interventional-radiological procedures simultaneously. This technique of combining trauma surgery and interventional radiology can improve mortality rates for trauma patients in India.

The possibility of non-surgical management (including interventional radiology) was raised by Japanese trauma surgeons after experiencing a high volume of trauma patients and surgery during their training at JPNATC. Collaboration in this area could contribute to optimising healthcare resources and improving India's healthcare system.