

Section 1

The Trauma Operating Room

Chapter

1

Trauma Operating Room

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General Principles

- A large operating room (OR) situated near the emergency department, elevators, and ICU should be designated as the Trauma OR to facilitate the logistics of patient flow and minimize transport. The room should be securable for high profile patients.
- A contingency plan for multiple simultaneous operations should be in place with the operating rooms in sufficient proximity to allow nursing and anesthesia cross-coverage and facilitate supervision of the surgical teams. Direct lines of communication between the OR, resuscitation area, ICU, other ORs, blood bank, and laboratory should be in place.
- All rooms should have ample overhead lighting as well as access to portable headlamps.
- Multiple monitors to display imaging, vital signs, and laboratory such as thromboelastometry, should be in place.
- Hybrid operating and interventional radiology teams should be familiar with operating in the hybrid room.
- A dedicated family waiting room should be identified, and all family should be directed to this area for the postoperative discussion.



Figure 1.1 The trauma operating room should be spacious in order to allow multiple surgical teams operating simultaneously. Multiple and large monitors should display vital signs, images, and laboratory results.

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(a)



(b)



Figure 1.2 (a) A hybrid operating room is highly valuable in severe multitrauma. Surgical teams and angiointervention specialists can work simultaneously without having to move the patient to the radiology suite. (b) Management of a multitrauma patient with a severe liver injury and a complex pelvic fracture. A combination of damage control surgery and angioembolization was performed.

Setup and Equipment

- Nursing staff should be regularly in-serviced about the trauma room setup, supplies, and common practices such as massive transfusion to minimize problems due to service line cross-coverage.
- While all attempts should be made to count instruments and ensure a correct final count, this may be postponed in life-threatening or damage control situations. Radio-frequency ID device embedded laparotomy sponges are a useful adjunct to these emergency situations.

The following should be readily available:

- Instrument trays including: laparotomy, sternotomy with pneumatic sternal saw, thoracotomy, emergency airway, amputation, and peripheral vascular.
- A wide selection of vascular shunts, catheters, vascular conduits, chest tubes, drain, staples, local hemostatic agents, advanced thermal cutting devices, and temporary abdominal closure supplies.
- Standard suture tree, including sternal closure wires, vascular sutures, and liver sutures.
- Adult and pediatric code cart
- The ability to provide cardiac pacing via transcutaneous, transvenous, or intramyocardial means.
- High-volume suction canister and device
- Tourniquets
- Endotracheal tube occluders
- Rigid sigmoidoscope, bronchoscope, gastroscope
- REBOA (Resuscitative Endovascular Balloon Occlusion of the Aorta) Catheters
- Portable fluoroscopy and personnel shielding devices should be immediately available for use in the OR
- The electrothermal bipolar vessel sealing system device (LigaSure device) is desirable

Warming

- Due to the large surface area exposed, trauma patients are susceptible to hypothermia
- The room should not be cold
- Forced air warmers and blankets should be used
- Warmed intravenous fluids should be available at all times
- All irrigation fluids should be warmed

Blood

- A type and screen should be sent immediately to the laboratory upon patient arrival at the emergency department.
- Emergency release products (uncross-matched O⁻ or O⁺ packed red blood cells as well as thawed AB or low titer

plasma) should be readily available in the emergency department and in the operating room.

- A rapid transfusion device should be available. An active discussion with anesthesia and OR nursing staff is beneficial regarding the specific type of rapid transfusion device employed in your hospital (e.g. Level One vs. Belmont rapid transfusion device).

Communication with Anesthesia Team

- Ensure open communication with anesthesia team during surgery. If possible, communicate with responsible head anesthesiologist by name. Set the tone early with all team members, particularly anesthesia and OR nurse, communicating that you require all team members to provide appropriate information to achieve a shared mental model.
- Appreciate that while a large OR can become crowded quickly, the anesthesia team must have sufficient space and access to the patient, anesthesia machine, and blood

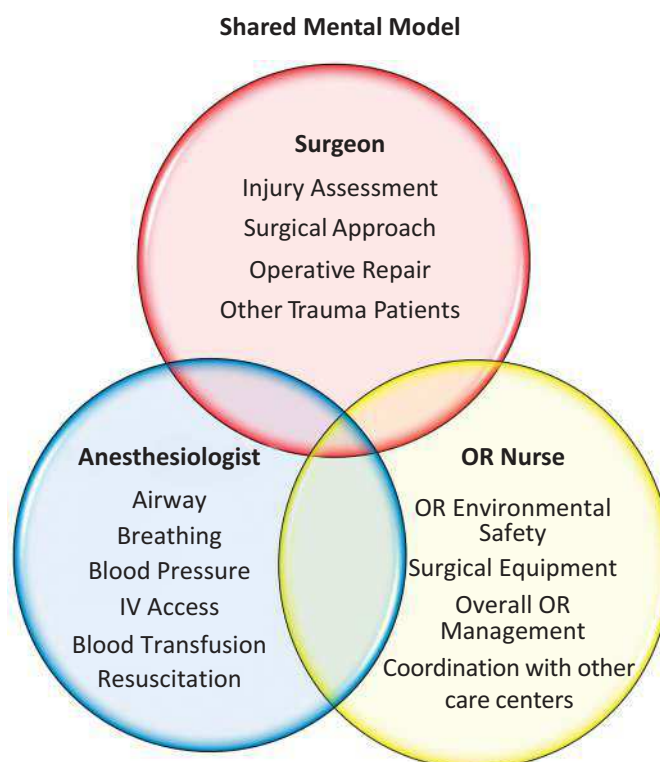
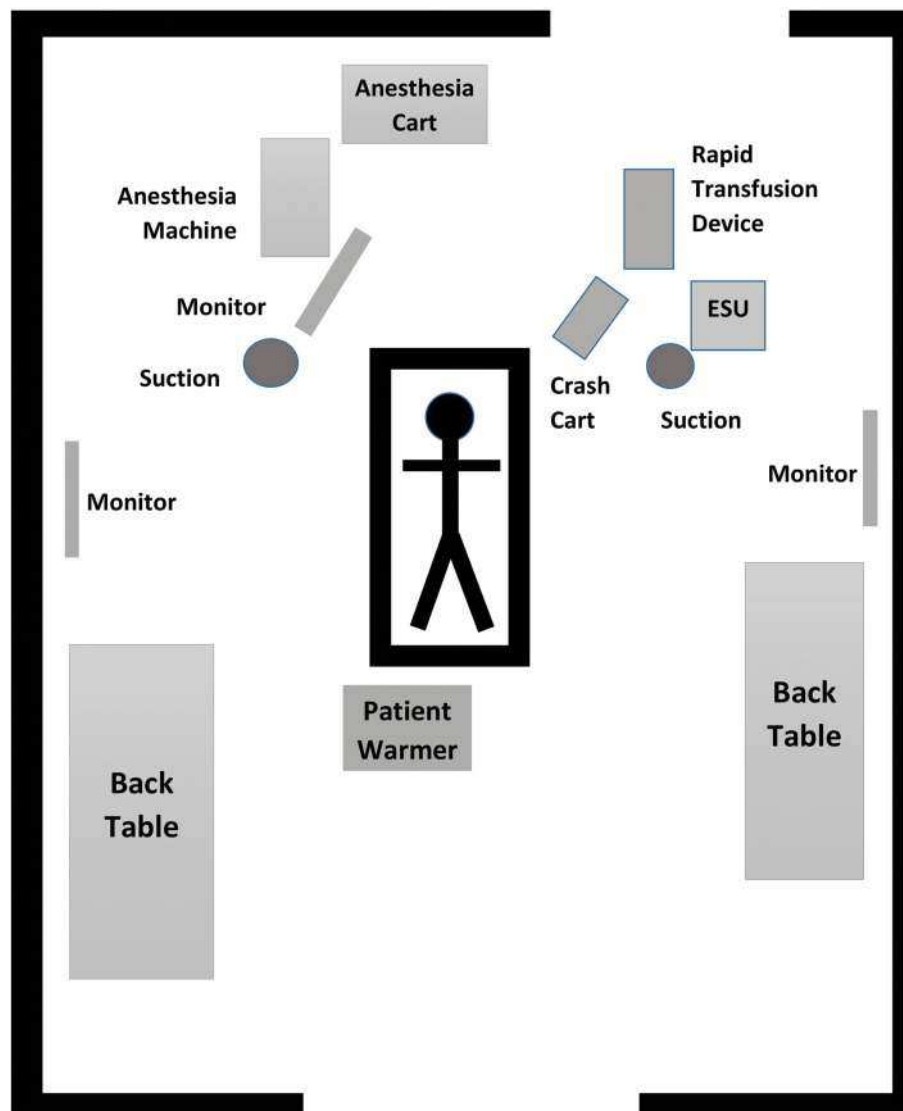


Figure 1.3 The Operating Room is a dynamic environment requiring excellent communication and teamwork for best outcomes of the trauma patient. Constant and effective communication is essential in order to optimize care.

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transfusion equipment. Anesthesia should also have ready egress and ingress out of the OR for delivery of blood products, labs, and unanticipated special equipment.

Figure 1.4 A proposed functional setup of the operating room teams, equipment, and supplies.



- If time permits, prior to surgical start, provide brief discussion of awareness of current intravascular access and plan for further access (e.g. large bore internal jugular, large bore subclavian, Rapid Infusion Catheters, large bore peripheral IV, or intra-osseous line).
- If the patient is not yet intubated, a discussion of intravascular access and blood products administered up to this point may prevent catastrophic hemodynamic collapse with anesthetic induction and may facilitate more rapid establishment of intravascular access and blood product administration.
- Recognize that many times the surgeon can achieve intravascular access (subclavian or femoral sites) as the anesthesia team is preparing the patient (moving to table, placing monitors, ensuring appropriate life support measures, etc.). Intravascular access areas can also be prepped into the surgical field to expedite large bore access and surgical start.

- As the case begins, continue to establish an open atmosphere for communication with specifics of intraoperative resuscitation to include administered blood products, degree of hemodynamic instability, and surgical management plan as it develops (Figure 1.2).
- When appropriate, communicate ability to temporarily slow down hemorrhage through packing, manual compression, aortic cross clamp, or REBOA, if anesthesia team is having difficulty maintaining an adequate pressure or perfusion without vasopressors. This can provide the anesthesia team time to transfuse blood products instead of resorting to vasopressors.
- Additional personnel are often available to assist with blood product administration. Again, a brief discussion with entire OR team can result in more useful personnel resources arriving.
- At a point when hemodynamic control has been established, a brief pause and thoughtful discussion with anesthesia will ensure a shared mental model of the patient's hemodynamic status and progress in resuscitation.
- After surgery has concluded, an informal debrief with the anesthesia team can result in enhanced teamwork and future improvement in intraoperative resuscitation.

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