



CARDIAC OPERATION THEATER MANUAL



Doc No	SDH/CTVS/01
Issue No	01
Rev No.	02
Date	1 JAN 2026
Page	3

Cardiac Operation Theatre Manual

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		Issue No	01
		Rev No.	02
		Date	1 JAN 2026
		Page	4
		Cardiac Operation Theatre Manual	

CONTENT LIST

S. No	Topics
1	Overview of Surgical Services
1.1	Organogram
1.2	Roles & Responsibilities
1.3	Process Flow Overview
1.4	Scope of Services
2	Receiving patient in OT
3	Planning and scheduling for surgeries
3.1	Theatre Booking
3.2	Financial Clearance
4	Pre Operative Management
5	Post Operative management
6	OT management
6.1	OT Cleaning
6.2	Waste Management in OT
6.3	Maintaining OT Environment
7	Day care Surgeries
8	Usage of Implants and Prosthesis
9	Protocol For Operation of Infected Patient
10	Condemnation of Instruments Used In OT
11	Surgical Safety Issues
11.1	Surgical Safety Checklist (WHO)
11.2	Prevention of Surgical Fires
11.3	Hazards in OT
12	List of Registers maintained in OT

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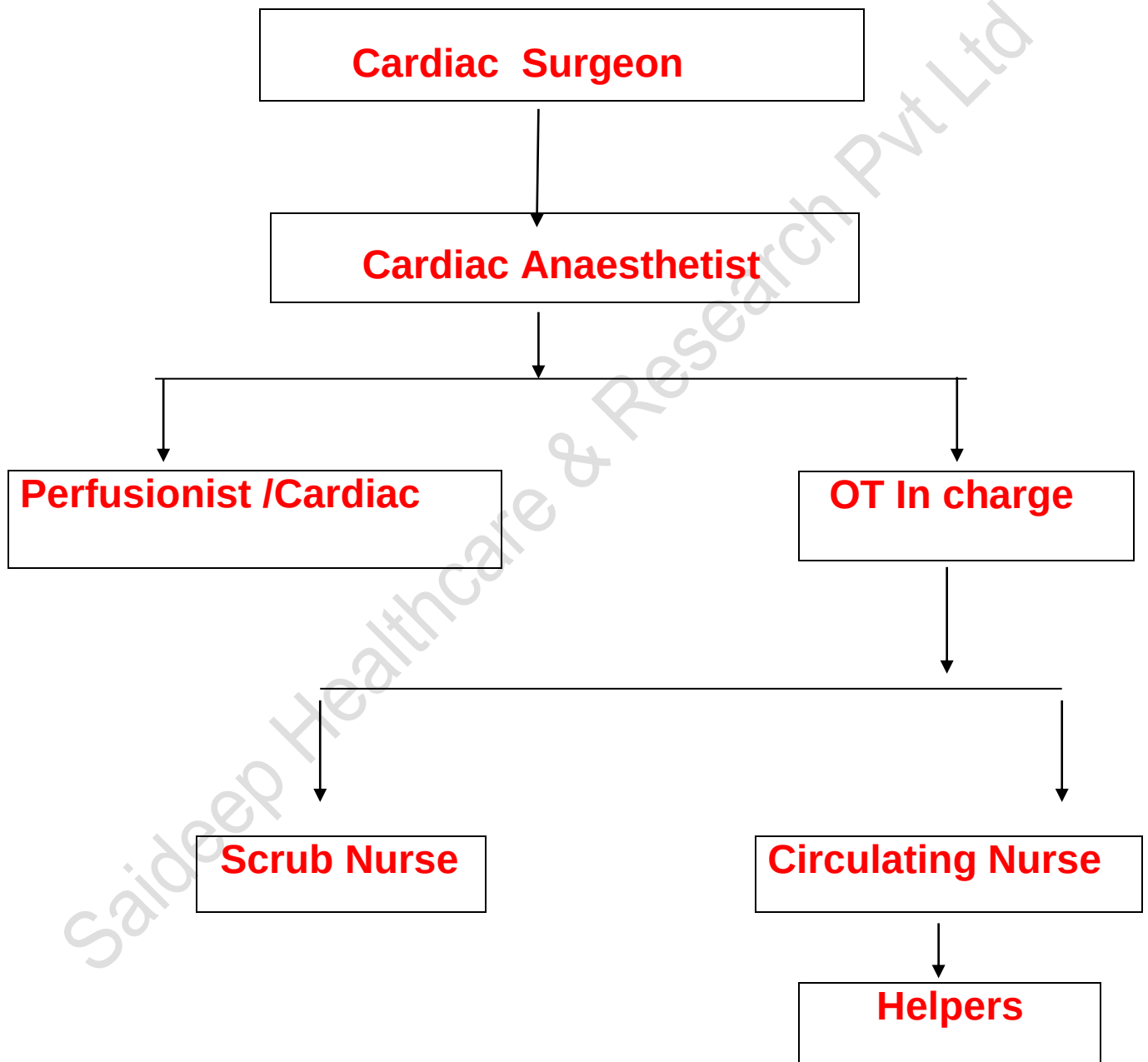
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Doc No	SDH/CTVS/01
Issue No	01
Rev No.	02
Date	1 JAN 2026
Page	5

Cardiac Operation Theatre Manual

1. OVERVIEW OF SURGICAL SERVICES

1.1. Organogram



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		Issue No	01
		Rev No.	02
		Date	1 JAN 2026
		Page	6
		Cardiac Operation Theatre Manual	

1.2. Roles and Responsibilities

1.2.1. SURGEONS RESPONSIBILITIES

Preoperative Assessment

- Carry out assessment and treatment planning of the patient.
- Advise the patient and family of the necessity of the procedure, risks and benefits, as well as alternative treatments available.
- Arrange that the patient is provided with information regarding necessary pre-procedure preparations, prior to scheduling the procedure.
- Refer the patient for necessary evaluations and other arrangements that are required.
- Advise admission on scheduled date.

Intra operative Care

- As per surgery plan

Post Operative care

- Immediate and follow up progress of patient while in hospital
- Assess wound healing
- Medication advice
- Discharge planning including advice for exercise, lifestyle modification, rehabilitation, nutrition etc.
- Refer to primary doctor/cardiologist for continuing care

1.2.2. ANESTHESIOLOGIST'S RESPONSIBILITIES:

- Pre-anesthetic evaluation and treatment
- Medical management of patients and their anesthetic procedures
- Post-anesthetic evaluation and treatment
- On-site medical direction of any non physician who participates in the delivery of anaesthesia care to the patient.

Pre operative Anaesthetist Responsibilities

- Carry out assessment and anesthesia planning of the patient.
- The development of an appropriate plan of anesthesia care:
- Reviewing the medical record.

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		Issue No	01
		Rev No.	02
		Date	1 JAN 2026
		Page	7
		Cardiac Operation Theatre Manual	

- Interviewing and examining the patient to:
 - a. Discuss the medical history, previous anesthetic experiences and drug therapy.
 - b. Assess those aspects of the physical condition that might affect decisions regarding peri-operative risk and management.
- Obtaining and/or reviewing tests and consultations necessary to the conduct of anesthesia.
- Determining the appropriate prescription of preoperative medications as necessary to the conduct of anesthesia.
- The responsible anesthesiologist shall verify that the above has been properly performed and documented in the patient's record.
- Advise the patient and family of the necessity of the procedure, risks and benefits. Ensure informed consent is obtained.
- Arrange that the patient is provided with information regarding necessary pre-procedure preparations, prior to scheduling the procedure.
- Refer the patient for necessary evaluations and other arrangements that are required.

Pre aesthetic Responsibilities

- Re-evaluation of patient immediately prior to induction.
- Preparation and check of equipment, drugs, fluids and gas supplies.
- Appropriate monitoring of the patient.
- Selection and administration of aesthetic agents to render the patient insensible to pain during the procedure.
- Support of life functions under the stress of aesthetic and surgical manipulations.
- Recording the events of the procedure.

Post Anaesthesia Care

- Availability of adequate nursing personnel and equipment necessary for safe post aesthetic care
- All patients who require intensive care shall be admitted to the Surgical ICU or its equivalent except by specific order of the anaesthesiologist responsible for the patient's care.
- The medical aspects of care in the Surgical ICU shall be governed by policies and procedures which have been reviewed and approved by the Director of Anaesthesiology.
- A patient transported to the Surgical ICU shall be accompanied by a member of the anaesthesia care team who is knowledgeable about the patient's condition. The patient shall be continually evaluated and treated during transport with monitoring and support appropriate to the patient's condition.

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		Issue No	01
		Rev No.	02
		Date	1 JAN 2026
		Page	8
		Cardiac Operation Theatre Manual	

- A member of the anaesthesia care team remains with the patient as long as medically necessary. Upon arrival in ICU, the patient shall be re-evaluated and a verbal report provided to the responsible staff by the member of the anaesthesia care team who accompanies the patient.
- Information concerning the preoperative condition and the surgical/anaesthetic course shall be transmitted to the Surgical ICU staff.
- The patient's condition shall be evaluated continually
- The patient shall be observed and monitored by methods appropriate to the patient's medical condition. Particular attention should be given to monitoring oxygenation, ventilation, circulation and temperature. During recovery from all anaesthetics, a quantitative method of assessing oxygenation such as pulse oximetry shall be employed in the initial phase of recovery
- An accurate written report of the ICU period shall be maintained. Use of an appropriate ICU scoring system is encouraged for each patient on admission, at appropriate intervals prior to discharge and at the time of discharge.
- General medical supervision and coordination of patient care in the ICU should be the responsibility of an anaesthesiologist.
- Assurance that the patient is discharged in accordance with policies established by the Department of Anaesthesiology.
- The Anaesthetist is responsible for the discharge assessment and discharge of the patient.
- Refer for rehabilitation.

1.2.3. OPERATION THEATRE TECHNICIAN

A Trained ancillary person who is responsible and accountable for the quality of care she/he provides to the patient in the operating room. Major functions include, but are not limited to, preparation of the instrumentation, equipment and environment for the various surgical procedures performed. Works directly under the supervision of the consultant anaesthesiologist in assigned area and is ultimately responsible to the consultant.

PRINCIPAL DUTIES AND RESPONSIBILITIES:

- Prepare the instrumentation, supplies and equipment required for the various procedures performed within the area.
 - ✓ Maintains integrity of the sterile field, recognize and resolves any breaks in technique.
 - ✓ Anticipates the needs of the anesthesiology team to facilitate the smooth and timely flow of the procedure.
 - ✓ Communicates essential information of the constantly changing requirements of the anesthesiology team i.e. updating preference cards.

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		Issue No	01
		Rev No.	02
		Date	1 JAN 2026
		Page	9
		Cardiac Operation Theatre Manual	

- Prepares room for patient admission on time and cleaning of the operating room according to established protocols.
 - ✓ Ensures the efficient and effective cleaning of the operating room according to established protocols.
 - ✓ Ensures the presence of all supplies and equipment required for subsequent procedures.
- Care and handling of anaesthesia instruments.
- Care and safety hazards of all speciality equipment.
- Use and maintenance of equipment and/or machinery required for. Most of this is expensive highly technical equipment requires expert handling and care.
- Organizes surgical tables with appropriate sterile supplies and equipment.
- Checks for proper functioning of equipment.
- Positions patient utilizing proper body mechanics and safety precautions.
 - ✓ Assist in the transfer of patients, ensuring that the bed is locked and secure during transfer.
 - ✓ Performs proper patient safety measures i.e. safety strap application, protective padding and arm-board placement.
 - ✓ Positions patient, maintaining proper body alignment of patient and self.
- Cleans and restocks rooms, utilizing knowledge of septic and aseptic technique.
 - ✓ Disposes of all waste materials according to established protocols. Pays particular attention to the disposal of hazardous (knife blades) or infected material.
 - ✓ Separates instrumentation into appropriate containers.
 - ✓ Follows Individualized protocols for the care and maintenance of specialized instrumentation.
 - ✓ Ensures the appropriate par levels of supplies and the presence of necessary equipment and furniture to prevent time consuming delays between procedures.
- Receives medication from stores, passed onto the sterile field to be administered by the anaesthesiology team. Assists the circulator and anaesthesiology team in accounting for amounts of medications and irrigations administered.
- Ensures the availability of equipment and supplies for any type of emergency.
 - ✓ Checks for completeness of emergency equipment supplies.
 - ✓ Checks for expiry dates on sterile products.
 - ✓ Resolves any deficiencies identified.

1.2.4. Nursing Team Leader:

Reporting to: Nursing Supervisor

Overall Objective: To ensure effective coordination & smooth functioning of their respective units through quality nursing care, provide leadership & support to all the nurses.

Responsibilities and key tasks

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		Issue No	01
		Rev No.	02
		Date	1 JAN 2026
		Page	10
		Cardiac Operation Theatre Manual	

- To conduct census for previous days' bed status, admission & discharge status of the day, transfer in & transfer out status.
- To access any requirement of special procedure depending upon criticality of patients.
- To control any adverse events of the day & nursing negligence's/error.
- To assign nurses to patients according to their experience, behaviour, preventability & communication skills.
- To supervise & ensure personal hygiene needs of the patients.
- To deploy, roster, function & supervision of GDAs.
- To ensure patient monitoring & recording as per specification.
- To document properly, maintain & periodic supervision of case files.
- To indent medicines & materials, supervision of proper stocking, arrangement & distribution.
- To ensure adherence to infection control practices, ensuring biomedical waste management & accompanying consultants on rounds.

1.2.5. Staff Nurse:

Overall Objective: Assist the Nursing Supervisor to deliver high quality nursing care in the hospital.

Responsibilities and key tasks

- To ensure delivery of patient care through implementation of prescribed medication and monitoring effects.
- To provide nursing care to patients based on established clinical practice standards.
- To collaborate with other disciplines to ensure effective and efficient patient care delivery.
- To actively participate in programs for quality improvement in nursing practices.
- To maintain positive interpersonal relations with staff.
- To promote a safe environment for patients, visitors and co-workers including the implementation of infection control policies of the hospital.

1.3. RESPONSIBILITY OF SCRUB NURSE

- Maintain a sterile atmosphere inside the OR
- Ensure the OT is clean & ready to be set up, prepares the instruments and equipments need for surgery.
- Wash the hands with special soak and putting on sterile garments including a Gown, Gloves, face mask.

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SAIDEEP HOSPITAL

Doc No	SDH/CTVS/01
Issue No	01
Rev No.	02
Date	1 JAN 2026
Page	11

Cardiac Operation Theatre Manual

- Counts all sponges, instruments, needle's and other tools with the presence of circulating Nurse.
- When the surgeon arrives the nurse helps him for wearing Gown and Gloves.
- During surgery, the scrub Nurse passing the needed instruments to the surgeon.
- Support the surgeon for maintaining the patient safety.
- Maintain the sterile field throughout the surgery.
- After the procedure, the scrub nurse again counts all instruments, sponges and other tools and informs the surgeon of the counts.
- Removes tools and equipments from the operation area and helps for dressing applying to the surgical site.
- Transport the patient to the post operative area.
- Send the specimen to lab and document it.
- Send the instruments to CSSD and document it.

1.4. RESPONSIBILITY OF CIRCULATING NURSE

- Arrange the OR and instruments according to each surgery and the surgeon's preference.
- Ensure the OR is set up correctly including inventory of disposables such as pads, sponges and freshly sterilized instruments from the CSSD.
- Checks all equipments needed during the procedure to verify that its functioning normally.
- Verify the patient's identity, necessary consent forms; review the sites, nature of procedure with the surgeon.
- Position the patient correctly on the operating table.
- The circulating nurse hooks up any necessary suction, cauterization equipment.
- During surgery, provides the surgical team with sterile fluids and medications as needed and also supplies if they need additional disposables and instruments.
- Circulating nurse is responsible for what is happening in that operating room, tracking supplies and equipments used.
- Make sure all counts correct before closing the cavity.
- Helps the anaesthesiologists to shift the patient to the post operative ICU and give hand over to ICU staff.
- Helps the scrub nurse and other staff to clean and preparing the operating room for next procedure.

1.5. Scope of Services:

- CABG
- AVR,MVR,DVR
- Correction of congenital heart disease
- PDA Ligation
- Valve Repair with or without ring
- ASD,VSD
- Vascular surgeries
- Ventricular septal rupture surgery

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		Issue No	01
		Rev No.	02
		Date	1 JAN 2026
		Page	12
		Cardiac Operation Theatre Manual	

- Mediastinoscopy

2. MANAGING PATIENT FLOW

2.1. RECEIVING THE PATIENT FROM WARD TO CVTS OT

- Check the patient ID band with file
- Check all consents including high risk consent
- Check all investigations including serology report

- Check blood group and availability of blood and components
- Check payment status
- Site preparation, betadine scrub, ornaments, nails, dentures.
- Pre medication status, any allergies
- Hand over from ward staff.

2.2. PATIENT INSIDE THE OR:

- Shift the patient from trolley to OT table.
- Connect cardiac monitors(all non invasive parameters)
- Central and peripheral ,Arterial line insertions
- Induction and intubation
- Catheterisation of the patient.
- Positioning of the patient
- Prepare surgical instrument trolley
- Betadine painting
- Draping

2.3. SHIFTING THE PATIENT FROM OR TO CVTS ICU

- Bring the patient coat from post operative ICU.
- Clamp the drainage tube with tubing clamps
- Empty the urine bag
- Disconnect the invasive monitoring and reconnect it to transport monitor.
- Disconnect the ventilator circuit and attach ambu bag.
- Shift all syringe pumps and IV infusions.
- Shift the patient from OT table to the coat
- Cover the patient with sterile sheets.
- Fill all the records related surgery (Anesthesia chart, nurse's note, operation record etc).
- Patient hand over to post operative staff.

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		Issue No	01
		Rev No.	02
		Date	1 JAN 2026
		Page	13
Cardiac Operation Theatre Manual			

3. PLANNING AND SCHEDULING OF SURGERIES

3.1. PURPOSE:

To describe the process of scheduling of surgeries.

3.2. SCOPE:

This procedure is applicable to the conduct of elective surgeries.

3.3. RESPONSIBILITY

The Chief Cardiac Surgeon, Chief Cardiac Anaesthesiologist and the Nurse In-Charge are responsible for coordinating the planning and scheduling process.

3.4. POLICIES

Allotment of OT days - Various department and units

	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
Cardiac OT							

The operation suits are ready on all days for surgeries. Theatres are allotted for the same on the previous day itself to the extent possible. One of the theatres is always kept ready for an emergency procedure.

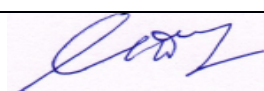
3.5. PROCEDURES

3.5.1. Theatre Booking

All elective procedures should be informed to the chief cardiac surgeon two days in advance in the OT allotment request. He in consultation with the anaesthesiologist and Nurse in charge prepares the allotment list on the previous day. Emergency surgeries should be notified to the sister in charge as early as possible.

3.5.2. Financial Clearance

- For planned procedure 100% of the estimate amount to be collected as advance
- For emergencies and non procedural observations – 50% of the estimated amount to be received within 24 hours of that admission.
- The remaining part of the bill to be collected before discharge.
- Undertaking should be taken before the surgery by the operating surgeon

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		Issue No	01
		Rev No.	02
		Date	1 JAN 2026
		Page	14
Cardiac Operation Theatre Manual			

4. PRE OPERATIVE MANAGEMENT

4.1. PURPOSE:

To describe the various pre-operative patient checks and preparatory processes.

4.2. SCOPE:

This procedure is applicable to the conduct of elective surgeries.

4.3. RESPONSIBILITY

The Chief Cardiac Surgeon, Chief Cardiac Anaesthesiologist and the Nurse In-Charge are responsible for coordinating the planning and scheduling process.

4.4. POLICIES

The pre-operative anesthetic evaluation will be performed and documented by a qualified anaesthetist, and shall be completed at least the day before the surgery.

4.5. PROCEDURES

4.5.1. Pre-operative Orders

Pre – operative orders are written by the surgeons in the case sheet on the previous day itself.

4.5.2. Pre-Anesthetic Assessment

- After pre anesthetic assessment, anesthetists fill the pre anesthetic assessment form. This form contains the details of the patients, investigations done, risk assessment, pre operative instructions and pre anesthetic medications.
- The other side of the same form is used as anesthesia record during surgery. The planned antibiotic prophylaxis should be mentioned in the appropriate space.

4.5.3. Transport and Shifting of the patients to the OT

- The cases which are already assessed, depending on the order of cases to be done in particular OTs - are shifted to pre-operative room after consulting the surgeon.
- We have two separate Attenders, to shift the cases from the wards to pre-operative room. The patient from the outside trolley are wheeled into the OT trolley and kept in the pre-operative room.
- Relatives are allowed for paediatric cases in the pre-operative room after wearing a sterile apron and cap if requested by the surgeon or the anaesthesiologist

4.5.4. Verification at Pre-operative Holding Area

- Staff nurses posted in the pre-operative room should verify the pre-operative check list, before patient is received in the pre-operative room.
- Children are pre - medicated in pre-operative room with oral/ IV drugs. Antibiotic prophylaxis is also given in the pre-operative room for the necessary cases.

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		Issue No	01
		Rev No.	02
		Date	1 JAN 2026
		Page	15
		Cardiac Operation Theatre Manual	

- For diabetic patients, blood sugars are checked in the pre-operative room with the glucometers and fluids are started accordingly. Nebulisation is given to the patients who need it in the pre-operative room.
- Pre-operative room is air – conditioned, equipped with central pipe line system for oxygen and suction anaesthesia machine and monitors. Whenever required, we start central line and arterial line in the pre-operative room itself. Epidural catheters are also placed in the pre operative rooms

5. POST OPERATIVE CARE

5.1. PURPOSE:

To describe the functioning of the post operative care unit within the OT complex.

5.2. SCOPE:

This procedure is applicable to all surgical cases.

5.3. RESPONSIBILITY

The operation theatre is managed by the Chief Cardiac Surgeon, Chief Cardiac Anaesthesiologist & Nurse in Charge.

5.4. POLICIES

All postoperative patients are immediately transferred to the post operative ICU with oxygen/ventilator support and monitors. Day care patients are observed in the preoperative area until they are ready to be transferred to the rooms/ ward. The nurse posted in the preoperative area is in charge of care of such patients until they are transferred to room/ ward.

6. OT MANAGEMENT

6.1. PURPOSE:

To describe the administrative and support service processes at the OT.

6.2. SCOPE:

This procedure is applicable to the main OT complex

6.3. RESPONSIBILITY

The operation theatre is managed by the HOD, (Sr. Cardiac Surgeon) and operation theatre Incharge who is in the cadre of assistant nursing superintendent.

6.4. PROCEDURES

6.4.1. General

- Operation theatre complex has three zones - clean or outer perimeter, semi sterile middle zone and sterile zone. The outer perimeter has 2 changing rooms for males and females. The next area is semi sterile zone which has rooms for HOD of anaesthesia, OT Incharge, Lounge for doctors and OT staff, pre-operative room and utility room. The third zone has sterile room and OTs. In sterile room all the sterile packs are received from

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		Issue No	01
		Rev No.	02
		Date	1 JAN 2026
		Page	16
		Cardiac Operation Theatre Manual	

CSSD through the sterile lift. The sterile lift operates between the sterile room and the sterile area of CSSD.

6.4.2. Cleaning of OTs:

- Daily routine work starts at 7a.m after taking report from the night duty staff. At the beginning of the day all the theatres including OT tables, trolleys, mayo's stands, OT light etc. are carbonized with antiseptic solution (5% eco-shield) to remove dust that has accumulated over night. Then OT is kept ready for the surgeries.
- After each case the theatre is cleaned with disinfectant solution. For biomedical waste disposal different universal colour coding system is practiced strictly inside each OT.
- Every day after the surgeries are over all the theatres are cleaned with detergent and disinfectant thoroughly. OTs functions on all week days.
- In the week end, on Saturday two OT's are washed and fumigated and kept ready for Sunday's emergency cases. On Sunday's the other OTs including pre-operative room and sterile room are washed and fumigated. On week days if any clean OT gets contaminated, that OT is washed and fumigated on the same day.
- All the equipments are cleaned with disinfectant solution and dried. Used instruments are washed, dried, packed and sent to CSSD department through the unsterile lift which is situated at the back of OT complex. In addition to the routine equipments, the following equipments are also available in OT complex like operating microscopes etc.
- Before and after surgery, dusting, cleaning and moping the operating room floor and equipments with antiseptic solutions.
- Every Saturday taking out all equipments and instruments, scrubbing the floors and walls of OT, sterile rooms, store room and all corridors' of the entire OR premises.
- After this fogging the OR with bacillocid 2%.
- All the equipments are cleaned with disinfectant solution and dried. Used instruments are washed, dried, packed and sent to CSSD department through the unsterile lift which is situated at the back of OT complex. In addition to the routine equipments, the following equipments are also available in OT complex like operating microscopes etc.

6.4.3. Biomedical waste and Linen:

- Biomedical wastes from each OT are taken to the sluice area. When the buckets are 3/4th full it is removed from the OT complex. Used linens are taken to the laundry in shifts. Syringes and Needles are destroyed by the needle burner and discarded in the puncture proof container.

6.4.4. Maintenance in the OT:

- Equipments are checked every day by the OT staff. Maintenance is done by the biomedical engineer once in a week. In emergency situation the biomedical engineers will come inside the OT and rectify the problems. Some equipment is sent to the biomedical department for minor repair after entering in the repair requisition book. Monitoring of company maintenance contracts for equipments are done by the company person along with the biomedical engineers. Even though central pipe lines are available, cylinders of

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		Date	1 JAN 2026
		Page	17
		Cardiac Operation Theatre Manual	

O2, N2O are stocked for emergency use. CO2 cylinders are maintained for laparoscopy surgeries.

- Positive pressure ventilation is maintained in the OTs. Air is introduced at one side of the ceiling and exhausted through the other side of ceiling about 10 times per hour to prevent bacterial contamination in the operative field. Air is supplied to the OTs by plenum ventilation. Air first passes through a series of dust filters and then enters the room through HEPA filters. Humidity is maintained at 50 – 55%. Temperature controlled and maintained from 18 – 24 degree Celsius. AC technicians control AHUs from the service floor.
- General maintenance like, carpentry, plumbing, electrical, painting, welding is done whenever needed. The complete theatre maintenance is done once in a year.

6.4.5. Microbiological sampling in the OT:

- Pre washing and post fumigation culture swabs are taken every month. The swabs are taken from the OT tables, Ac grill, Anaesthesia machine, suction apparatus, walls, floors and scrub areas.

6.4.6. Records maintained in OT:

- Details of surgeries done daily are entered in the operation theatre register format in the computer and the report is taken for 24 hours and submitted to Medical Superintendent's and then filed in the OT register file. Operation notes are entered in the computer by the doctors and filed. Monthly statistics and yearly statistics are taken regularly and distributed to the higher officials. After each case the charges are entered in the billing chart and entered in the computer.
- OT drug replacement is entered in the computer and billed by the pharmacy. Every month anaesthetist duty roster is distributed to all the departments. Monthly duty schedule for all the OT staff is entered in the computer and sent to the respective departments.
- Handing and taking over note book is maintained separately by staff nurses, nursing assistants and OT Attenders.
- Store items are indented and received every week. Pharmacy items are indented and received once in 15days.

7. DAY CARE SURGERIES

7.1. PURPOSE: To describe the process of handling day care surgery cases.

7.2. SCOPE: This procedure is applicable to the conduct of day care surgeries.

7.3. RESPONSIBILITY

The Chief Cardiac Surgeon, Chief Cardiac Anaesthesiologist and Nurse in charge are responsible for coordinating the planning and scheduling process.

7.4. PROCEDURES

- Day care surgeries like mediastnaoscopy, resuturing and sternal wire removal where the patients will be discharged from the hospital on the same day. All day care patients

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		Issue No	01
		Rev No.	02
		Date	1 JAN 2026
		Page	18
		Cardiac Operation Theatre Manual	

should have a bystander who accompanies the patient to the hospital. Patient should be admitted to a room/ ward and not to be transferred from OP.

- The day care cases posted under anaesthesia are generally assessed at the time of admission and given pre – op orders. The preparations should be done in the room / ward before transferring to OT.
- After the procedure, patients are transferred to pre operative area for observation and then to the room / ward. Patients are discharged as they recover, after consulting the surgeons and the anaesthetists.

8. USAGE OF IMPLANTS AND PROSTHESIS

- Prior to surgery, inform to the purchase manager to arrange the implants and prosthesis for surgery.
- After the procedure, complete the formalities of documentation such as patient data entry in implant register and full fill the concern forms.
- Inform the patient/bystander regarding the awareness.
- Inform the concerned departments regarding the usage of particular implants.
- Handover the details regarding the implant to the concerned staff.

9. PROTOCOL FOR OPERATION OF INFECTED PATIENT

- Use all disposable line for draping the patients.
- All surgical people should wear PPE.
- Discard all disposable items after use.
- Dispose all waste according to the colour code and label it as infected or put HAZMAT sticker on it.
- Inform the CSSD & HK people regarding the infection.
- All surgical instruments wash with antiseptic solutions, and then dip this in to Cidex solution for 30 minutes. After this wash with running water and send for double autoclaving.
- After case double mop the whole area with aseptic solutions.
- Fumigate the OR after the case.

10. CONDEMNATION OF INSTRUMENTS USED IN OT

- Inform the broken /damage status to the stores.
- Write the condemnation request form.
- Send the instrument along with the form for the approval of condemnation committee.
- After getting approval send them to stores to replace/discarding.
- Keep a copy of the form/report in condemnation file.

11. SURGICAL SAFETY

11.1. SURGICAL SAFETY CHECKLIST

- The Safe Surgery Checklist is designed by WHO, to assist surgical teams to reduce the number of preventable surgical complications, improve efficiency and further improve surgical outcomes for patients.

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		Issue No	01
		Rev No.	02
		Date	1 JAN 2026
		Page	19
Cardiac Operation Theatre Manual			

- The Checklist divides the operation into three phases, each corresponding to a specific time period in the normal flow of a procedure—the period before induction of anaesthesia (Sign In), the period after induction and before surgical incision (Time Out), and the period during or immediately after wound closure but before removing the patient from the operating room (Sign Out). In each phase, the Checklist coordinator must be permitted to confirm that the team has completed its tasks before it proceeds further.
- As operating teams become familiar with the steps of the Checklist, they can integrate the checks into their familiar work patterns and verbalize their completion of each step without the explicit intervention of the Checklist coordinator.
- Each team should seek to incorporate use of the Checklist into its work with maximum efficiency and minimum disruption, while aiming to accomplish the steps effectively.

Before induction of anaesthesia	Before skin incision	Before patient leaves operating room
SIGN IN ☐ PATIENT HAS CONFIRMED • IDENTITY • SITE • PROCEDURE • CONSENT ☐ SITE MARKED/NOT APPLICABLE ☐ ANAESTHESIA SAFETY CHECK COMPLETED ☐ PULSE OXIMETER ON PATIENT AND FUNCTIONING DOES PATIENT HAVE A: KNOWN ALLERGY? ☐ NO ☐ YES DIFFICULT AIRWAY/ASPIRATION RISK? ☐ NO ☐ YES, AND EQUIPMENT/ASSISTANCE AVAILABLE RISK OF >500ML BLOOD LOSS (7ML/KG IN CHILDREN)? ☐ NO ☐ YES, AND ADEQUATE INTRAVENOUS ACCESS AND FLUIDS PLANNED	TIME OUT ☐ CONFIRM ALL TEAM MEMBERS HAVE INTRODUCED THEMSELVES BY NAME AND ROLE ☐ SURGEON, ANAESTHESIA PROFESSIONAL AND NURSE VERBALLY CONFIRM • PATIENT • SITE • PROCEDURE ANTICIPATED CRITICAL EVENTS ☐ SURGEON REVIEWS: WHAT ARE THE CRITICAL OR UNEXPECTED STEPS, OPERATIVE DURATION, ANTICIPATED BLOOD LOSS? ☐ ANAESTHESIA TEAM REVIEWS: ARE THERE ANY PATIENT-SPECIFIC CONCERNS? ☐ NURSING TEAM REVIEWS: HAS STERILITY (INCLUDING INDICATOR RESULTS) BEEN CONFIRMED? ARE THERE EQUIPMENT ISSUES OR ANY CONCERNS? HAS ANTIBIOTIC PROPHYLAXIS BEEN GIVEN WITHIN THE LAST 60 MINUTES? ☐ YES ☐ NOT APPLICABLE IS ESSENTIAL IMAGING DISPLAYED? ☐ YES ☐ NOT APPLICABLE	SIGN OUT NURSE VERBALLY CONFIRMS WITH THE TEAM: ☐ THE NAME OF THE PROCEDURE RECORDED ☐ THAT INSTRUMENT, SPONGE AND NEEDLE COUNTS ARE CORRECT (OR NOT APPLICABLE) ☐ HOW THE SPECIMEN IS LABELLED (INCLUDING PATIENT NAME) ☐ WHETHER THERE ARE ANY EQUIPMENT PROBLEMS TO BE ADDRESSED ☐ SURGEON, ANAESTHESIA PROFESSIONAL AND NURSE REVIEW THE KEY CONCERNS FOR RECOVERY AND MANAGEMENT OF THIS PATIENT

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 SAIDEEP HEALTHCARE & RESEARCH PVT. LTD.	SAIDEEP HOSPITAL	Doc No	SDH/CTVS/01
		Issue No	01
		Rev No.	02
		Date	1 JAN 2026
		Page	20
		Cardiac Operation Theatre Manual	

11.2. Prevention of Surgical Fires

11.2.1. Surgical Team Communication Is Essential

The applicability of the following recommendations must be considered individually for the needs of each patient.

11.2.2. At the start of surgery:

- Both O₂ and N₂O support combustion. Be aware of possible enriched O₂ and N₂O atmospheres near the surgical site under the drapes, especially during head and neck surgery.
- Question the need for 100% O₂ for open delivery during head/neck surgery.
- As a general policy, use air or FiO₂ <30% for open delivery.
- Arrange drapes to minimize O₂ and N₂O build up underneath.
- Use an incise drape to isolate head and neck incisions from O₂ and alcohol vapours.
- Do not drape the patient until all flammable preps have fully dried.
- Coat body hair near the surgical site with water-soluble surgical lubricating jelly to make it non flammable.
- Fibre-optic light sources can start fires. Complete all cable connections before activating the source. Place source in STANDBY when disconnecting cables.

12. HAZARDS IN OT

WASTE ANESTHETIC GASES

The principal source of waste anesthetic gas in the hospital is leakage from anesthetic equipment. Nitrous oxide, enflurane, halothane, and isoflurane

Hazard Location

- Exposures occur in operating rooms; emergency rooms; outpatient clinics; and miscellaneous locations.
- Leakage from anesthetic equipment is in most cases associated with the work practices and habits of the anaesthesiologists and nurse anaesthetists.
- Incorrect installation and maintenance of scavenging systems is also a major factor.

Environmental monitoring

- The vapours of anesthetic agents such as enflurane, halothane and isoflurane can be monitored with charcoal tubes. Nitrous oxide can be monitored with a direct-reading infrared analyzer or by passive dosimeters.
- Records of all collected air samples should be kept, and results should be noted in the medical records of the corresponding staff

Engineering controls

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SAIDEEP HOSPITAL

Doc No	SDH/CTVS/01
Issue No	01
Rev No.	02
Date	1 JAN 2026
Page	21

Cardiac Operation Theatre Manual

Exposures may occur in the following ways:

- Gas may escape during hook-up and check-out of the system.
- Excess gas may seep over the lip of the patient's mask.
- The patient may exhale gas into the room.
- Leaks may occur in the anesthetic breathing system.
- Scavenging systems may be misused or not used at all.

Degree of Exposure

- The degree of exposure in the operating room depends on the amount of leakage, the adequacy of the ventilation system, and the type of operation being done.
- Gas leakage occurs primarily when face masks are used for short procedures and a problem exists with the anaesthetist's technique or with the patient's facial anatomy (e.g. when the patient has no teeth).
- A related problem is the exposure of recovery room personnel to waste gases in the exhaled breath of post-operative patients.
- Nitrous oxide, halothane, and Methoxyflurane have all been found in the exhaled breath of both patients and operating room staff for periods ranging from hours to several days after the administration of the anesthetic. This phenomenon may pose a significant health hazard to staff in crowded recovery rooms with a high patient turnover rate.

Potential Health Effects

Acute effects

- Staff exposed to excessive amounts of anesthetic gases begin to feel like anesthetized patients, experiencing drowsiness, irritability, depression, headache, nausea, fatigue, and problems of judgment and coordination.
- These behavioural effects are of particular concern because both the success of the surgery and health of the operating room staff may be compromised.

Chronic effects

- Epidemiologic studies have found increased incidences of embryo toxicity, liver and kidney disease, and cancer among groups of female personnel working in the operating room.

- A scavenging system is the basic engineering control for waste anesthetic gases.
- Such systems collect waste gas and ventilate it from the operating room.
- Although some scavenging systems are elaborate and costly, adequate systems can be inexpensive and can dramatically reduce contamination of the operating room environment.
- The equipment must be regularly monitored for leakage, improper design, or tubing defects. In some cases, poor wall connections and compression fittings or other defective equipment may be the sources of leakage.

Personal protective equipment

- Personal protective equipment is not needed or recommended if an adequate control program is in place. However, monitoring should be done, and personal protective equipment should be available for use in case of an emergency.

Work practices

- Operating-room staff can protect themselves from excess exposure by properly connecting the scavenging equipment, turning the gas off when the breathing system is disconnected from the patient, and ensuring that all patients have properly fitting masks.

Training programs

- Staff involved with waste anesthetic gases should be trained to recognize, understand, monitor, and reduce the health and safety risks of exposure to these substances.

Medical Monitoring

- Staff exposed to anesthetic gases should have complete medical histories on file.
- These should include family, genetic, and occupational histories and the outcomes

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 SAIDEEP HEALTHCARE & RESEARCH PVT. LTD.	SAIDEEP HOSPITAL	Doc No	SDH/CTVS/01
		Issue No	01
		Rev No.	02
		Date	1 JAN 2026
		Page	22
	Cardiac Operation Theatre Manual		

- Some observers have suggested a relationship between exposure to waste anesthetic gases and reports of increased cancer rates and adverse effects on reproduction among exposed staff.

of all pregnancies of female staff or of the wives of male staff.

- Baseline data should be obtained on the hepatic, renal, and hematopoietic systems.
- Exposed staff should be monitored periodically for liver and kidney function.

BLOOD BORNE PATHOGENS (INFECTIONS)

Potential Hazard

- Exposure to blood and OPIM and life threatening BBPs such as Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), and Human Immunodeficiency Virus (HIV).

Preventive Precautions

- Wear appropriate PPE as required by the Blood borne Pathogens Standard if blood or Other Potentially Infectious Materials exposure is anticipated.
- The type and amount of PPE depends on the anticipated exposure.
- Gloves must be worn when hand contact with blood, mucous membranes, or non-intact skin is anticipated, or when handling contaminated items or surfaces.
- Minimize the hazards of exposure to Blood Borne Pathogens in the surgery area by promoting the use of:
 - Safer needle/other sharps device
 - Blunt suture needles
 - Needleless IV connectors
 - Proper containerization of sharps
 - "No Pass Zone" for surgical instruments
- A Hands-free technique for passing instruments The hands-free technique is a work practice whereby a tray or other means are used to eliminate simultaneous handling of sharp instruments during surgery.
- Discarding of contaminated needles and other sharp instruments **immediately** or as soon as feasible after use into appropriate containers
- Sharps containers need to be available, and in close proximity to areas where sharps may be

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SAIDEEP HOSPITAL

Doc No	SDH/CTVS/01
Issue No	01
Rev No.	02
Date	1 JAN 2026
Page	23

Cardiac Operation Theatre Manual

found.

- Contaminated needles and other contaminated sharps shall not be bent, recapped, or removed except as noted in paragraphs.
- Employers must provide readily accessible hand washing facilities, and ensure that employees wash their hands immediately or as soon as feasible after removal of gloves.

LATEX ALLERGY

Potential Hazard

- Developing latex allergy from exposure to latex from using products that contain latex such as, gloves, catheters, tubing.

Possible Solutions

- Staff should wear appropriate gloves for employees to wear, including "hypoallergenic gloves, glove liners, powder less gloves or other **similar alternatives**"
- Hypoallergenic gloves are not to be assumed to be non-latex or latex-free.**
- If latex must be used, choose a low protein, powder-free glove. (Powder-free gloves seem to reduce systemic allergic responses.)

METHYL METHACRYLATE

Hazard Location

- Methyl methacrylate is an acrylic cement-like substance commonly used in operation rooms to secure surgical prostheses to bone, e.g. in total hip replacements.
- This compound is also used in dental prostheses. The two components, a liquid and a powder, are mixed immediately before use.

Potential Health Effects

Acute effects

- Methyl methacrylate affects the central nervous system.
- Methyl methacrylate is an eye, skin, and mucous membrane irritant.
- Patients exposed to this compound have suffered acute episodes of hypotension, low blood pressure, and cardiac arrest

Chronic effects

Preventive Precautions

Engineering controls

- A local exhaust hood should be used to conduct exhaust fumes from the area in which methyl methacrylate is mixed. A tent hood may be used unless mixing can be done in a separately ventilated area.
- Portable hoods are available for operating room use.

Protective equipment

- Staffs who handle methyl methacrylate should wear personal protective equipment and clothing.
- This may include gloves, goggles, face shields, and respirators, as appropriate.
- Portable hoods are available for operating room use.

Work practices

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SAIDEEP HOSPITAL

Doc No	SDH/CTVS/01
Issue No	01
Rev No.	02
Date	1 JAN 2026
Page	24

Cardiac Operation Theatre Manual

- Methyl methacrylate has been reported to produce degenerative liver changes in experimental animals.
- This chemical has also been reported to be mutagenic.

- Staff should be instructed to avoid touching contaminated hands or gloves to their eyes or mouths.

Medical Monitoring

- Pre-exposure data should be recorded for the skin and respiratory systems of staff that may be exposed to methyl methacrylate.
- Periodic monitoring thereafter should emphasize the skin and respiratory systems.

COMPRESSED GASES

Potential Hazard

- Compressed gases present a unique hazard. Depending on the particular gas, there is a potential for simultaneous exposure to both mechanical and chemical hazards. Gases may be:
 1. Flammable or combustible
 2. Explosive
 3. Corrosive
 4. Poisonous
 5. Inert
 6. or a combination of hazards
- If the gas is flammable, flash points lower than room temperature compounded by high rates of diffusion present a danger of fire or explosion.
- Additional hazards of reactivity and toxicity of the gas, as well as asphyxiation, can be caused by high concentrations of even "harmless" gases such as nitrogen.
- Since the gases are contained in heavy, highly pressurized metal containers, the large amount of potential energy resulting from compression of the gas makes the cylinder a potential rocket or fragmentation bomb

Preventive Precautions:

- Careful procedures are necessary for handling the various compressed gases, the cylinders containing the compressed gases, regulators or valves used to control gas flow, and the piping used to confine gases during flow
- **Identification**
 1. **The contents of any compressed gas cylinder must be clearly identified.** Such identification should be stencilled or stamped on the cylinder or a label.
 2. Commercially available three-part tag systems may also be used for identification and inventory.
 3. No compressed gas cylinder should be accepted for use that does not legibly identify its contents by name.
 4. If the labelling on a cylinder becomes unclear or an attached tag is defaced to the point the contents cannot be identified, the cylinder should be marked "contents unknown" and returned directly to the manufacturer.

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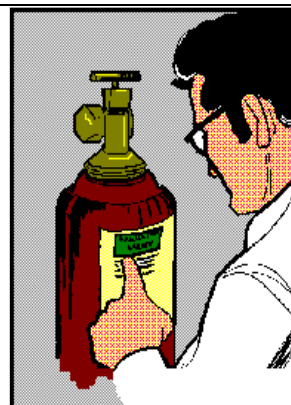


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SAIDEEP HOSPITAL

Doc No	SDH/CTVS/01
Issue No	01
Rev No.	02
Date	1 JAN 2026
Page	25

Cardiac Operation Theatre Manual



**Always read
the label!!**

- **Never rely on the colour of the cylinder for identification.** Colour coding is not reliable because cylinder colours may vary with the supplier. Additionally, labels on caps have little value because caps are interchangeable.



- All **gas lines** leading from a compressed gas supply should be clearly labelled to identify the gas, the laboratory or area served, and the relevant emergency telephone numbers.
- The labels should be colour coded to distinguish hazardous gases (such as flammable, toxic, or corrosive substances) (e.g., a yellow background and black letters).
- Signs should be conspicuously posted in areas where flammable compressed gases are stored, identifying the substances and appropriate precautions (e.g., HYDROGEN - FLAMMABLE GAS - NO SMOKING - NO OPEN FLAMES).
- **Handling & Use**

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Cardiac Operation Theatre Manual

Doc No	SDH/CTVS/01
Issue No	01
Rev No.	02
Date	1 JAN 2026
Page	26



Gas cylinders must be secured at all times to prevent tipping.

- Cylinders may be attached to a bench top, individually to the wall, placed in a holding cage, or have a non-tip base attached. Chains or sturdy straps may be used to secure them.
- **If a leaking cylinder is discovered, move it to a safe place (if it is safe to do so) and inform the Engineering Department.**
- You should also call the vendor as soon as possible.
- **Under no circumstances should any attempt be made to repair a cylinder or valve.**
- To minimize undesirable connections, only standard combinations of valves and fittings should be used in compressed gas installations; the assembly of miscellaneous parts should be avoided.
- The threads on cylinder valves, regulators and other fittings should be examined to ensure they correspond and are undamaged.
- Cylinders should be placed with the valve accessible at all times.
- The main cylinder valve should be closed as soon as it is no longer necessary that it be open (i.e., it should never be left open when the equipment is unattended or not operating).
- This is necessary not only for safety when the cylinder is under pressure, but also to prevent the corrosion and contamination resulting from diffusion of air and moisture into the cylinder after it has been emptied.
- Cylinders are equipped with either a hand wheel or stem valve.
- For cylinders equipped with a stem valve, the valve spindle key should remain on the stem while the cylinder is in service.

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SAIDEEP HOSPITAL

Doc No	SDH/CTVS/01
Issue No	01
Rev No.	02
Date	1 JAN 2026
Page	27

Cardiac Operation Theatre Manual

- Only wrenches or tools provided by the cylinder supplier should be used to open or close a valve. At no time should pliers be used to open a cylinder valve.
- Some valves may require washers; this should be checked before the regulator is fitted.
- Cylinder valves should be opened slowly.
- Oxygen cylinder valves should be opened all the way.
- Open up the oxygen cylinder valve stem just a crack. Once the needle on the high pressure gauge has stopped, open up the valve all the way.
- This back-seats the valve.
- Oxygen cylinders must have the valve opened up all the way because of the high pressure in the cylinder.
- There is a back-seating valve on the oxygen cylinder. This prevents the high-pressure gas from leaking out through the threaded stem.
- When opening the valve on a cylinder containing an irritating or toxic gas, the user should position the cylinder with the valve pointing away from them and warn those working nearby.



- An open flame shall never be used to detect leaks of flammable gases. Hydrogen flame is invisible, so "feel" for heat.
- One common practice is to use a natural bristle broom to "sweep" the air in front of you.
- All cylinders containing flammable gases should be stored in a well-ventilated area.
- Oxygen cylinders, full or empty, shall not be stored in the same vicinity as flammable gases.

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SAIDEEP HOSPITAL

Cardiac Operation Theatre Manual

Doc No	SDH/CTVS/01
Issue No	01
Rev No.	02
Date	1 JAN 2026
Page	28

- Greasy and oily materials shall never be stored around oxygen; nor should oil or grease be applied to fittings.

Regulators are gas specific and not necessarily interchangeable !

Always make sure that the regulator and valve fittings are compatible.



- If there is any question as to the suitability of a regulator for a particular gas, check with engineering department.
- After the regulator is attached, the cylinder valve should be opened just enough to indicate pressure on the regulator gauge (no more than one full turn) and all the connections checked with a soap solution for leaks.
- Never use oil or grease on the regulator of a cylinder valve.
- Plastic piping shall not be used for any portion of a high-pressure system.
- Do not use cast iron pipe for chlorine
- Do not conceal distribution lines where a high concentration of a leaking hazardous gas can build up and cause an accident.
- Distribution lines and their outlets should be clearly labelled as to the type of gas contained.
- Piping systems should be inspected for leaks on a regular basis.
- Special attention should be given to fittings as well as possible cracks that may have developed.

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Quality Head		Chairman & Managing Director	



SAIDEEP HOSPITAL

Doc No	SDH/CTVS/01
Issue No	01
Rev No.	02
Date	1 JAN 2026
Page	29

Cardiac Operation Theatre Manual

- Empty and full cylinders should be stored in separate areas.
- Where the possibility of **flow reversal** exists, the cylinder discharge lines should be equipped with approved check valves to prevent inadvertent contamination of cylinders connected to a closed system.
- "Sucking back" is particularly troublesome where gases are used as reactants in a closed system.
- If there is a possibility that the container has been contaminated, it should be so labelled and returned to the supplier.
- **Liquid bulk cylinders**
 1. These cylinders usually have a number of valves on the top of the cylinder.
 2. All valves should be clearly marked as to their function.
 3. These cylinders will also vent their contents when a preset internal pressure is reached, therefore, they should be stored or placed in service where there is adequate ventilation.

Always use safety glasses (preferably with a face shield) when handling and using compressed gases, especially when connecting and disconnecting compressed gas regulators and lines.

All compressed gas cylinders, including lecture-size cylinders, must be returned to the supplier when empty or no longer in use.

- **Transportation of Cylinders**
 1. The cylinders that contain compressed gases are primarily shipping containers and should not be subjected to rough handling or abuse. Such misuse can seriously weaken the cylinder and render it unfit for further use or transform it into a rocket having sufficient thrust to drive it through masonry walls.
 2. To protect the valve during transportation, the cover cap should be screwed on hand tight

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Quality Head		Chairman & Managing Director	



SAIDEEP HOSPITAL

Doc No	SDH/CTVS/01
Issue No	01
Rev No.	02
Date	1 JAN 2026
Page	30

Cardiac Operation Theatre Manual

and remain on until the cylinder is in place and ready for use.

3. Cylinders should never be rolled or dragged.
4. When moving large cylinders, they should be strapped to a properly designed wheeled cart to ensure stability.
5. Only one cylinder should be handled (moved) at a time.

ELECTRICAL HAZARDS

Potential Hazard:

- The staff in the operating room can get electrical current shocks due to damage wires which supply electric current to the equipment.
- Due to damaged wires in contact with the wet floor.
- Due to improper maintenance of the supply resulting in the leakage of the current in the body of the equipment.

Preventive precautions:

- There should be no wires lying on the floor of the Operating Room.
- Proper preventive maintenance calendar for the equipment.
- Use of three pronged plugs for all the equipment in the OT.

EQUIPMENT HAZARDS

Potential Hazard

- Staff exposure to burns or shocks from poorly maintained equipment or improperly trained staff (e.g., autoclaves, warming cabinets, defibrillators).

Preventive Precautions:

- Employees will be trained on safe use of Equipment
- Maintain adequate working space and access to equipment.
- Visually inspect cords. Do not use if frayed or damaged. Equipment cords should be grounded.
- Visual inspection of equipment before using.
- If something doesn't look right, don't use the machine, and call for assistance from Biomedical Engineering Department.
- Ensure that all electrical service near sources of water is properly grounded
- Use appropriate personal protective equipment and safe work practices for assessed hazards (e.g., when handling hot items use gloves, and don't open autoclaves or sterilizers until items are sufficiently cooled

SLIPS/TRIPS/FALLS

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SAIDEEP HOSPITAL

Doc No	SDH/CTVS/01
Issue No	01
Rev No.	02
Date	1 JAN 2026
Page	31

Cardiac Operation Theatre Manual

Potential Hazard

- Staff exposure to trips, and falls, e.g., falling over portable equipment that easily blends into the floor or slipping on debris, (bandages, tubing, blood, IV fluids) that are spilled on the floor.
- Electrical cords crossing floors may also be a trip hazard.

Preventive Precautions

- All places of employment shall be kept clean and orderly and in a sanitary condition
- Aisles and passageways shall be kept clear and in good repairs, with no obstruction across or in aisles that could create a hazard.
- Provide ceiling or floor plugs for equipment, so power cords need not run across pathways
- Mark mobile equipment with a bright colour, or a tape "X", to help distinguish it from the floor and make it more visible to employees

HAZARDS DUE TO HEAVY LIFTING / AWKWARD POSITIONS IN OT

Potential Hazard

- Employee exposure to MSD from repetitive, prolonged, reaching, when sorting sterilized packages or lifting above shoulder height to reach high shelves of equipment or when pushing and pulling heavy carts full of dirty or clean items.
- During shifting of the patients.
- Carrying used instruments for cleaning and disinfection after usage.
- Static postures may occur from continuously standing in one position while sorting instruments.
- Standing for long hours during the Operative procedures.



Reaching/Lifting

Preventive Precautions

- Use carts with large, low rolling, low resistance wheels that can easily roll over mixed flooring so that they can transfer the instruments easily.
- Minimize prolonged overhead activity (e.g., lower stacking shelves to shoulder height).
- Use height-adjustable work surfaces or lift tables to minimize head tilt.
- Rotate workers through repetitive tasks.
- Pad the edge of work surfaces which come into contact with the elbow or forearm which could cause contact trauma.
- Use anti-fatigue mats.
- Use shoes with well-cushioned insoles and soles.
- Provide a foot rest bar so employees can continually alter their posture by raising one foot.

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SAIDEEP HOSPITAL

Cardiac Operation Theatre Manual

Doc No	SDH/CTVS/01
Issue No	01
Rev No.	02
Date	1 JAN 2026
Page	32

Potential Hazard:

- Cuts and injuries to the staff due to improper handling
- Infections due to cuts or pricks from instruments contaminated with infected blood or potentially infectious material.

Preventive Precautions:

When passing sharps

- Uncapped or otherwise unprotected sharps should never be passed directly from one person to another. In the operating theater or procedure room, pass sharp instruments in such a way that the surgeon and assistant are never touching the item at the same time. This way of passing sharps is known as the "hands-free" technique:
- The assistant places the instrument in a sterile kidney basin or in a designated "safe zone" in the sterile field.
- The assistant tells the surgeon or nurse that the instrument is in the kidney basin or safe zone.
- The surgeon or nurse picks up the instrument, uses it, and returns it to the basin or safe zone.



When giving injections:

- Unexpected patient movement at the time of injection can lead to accidental needle sticks.
- Therefore, always warn patients when you are about to give them an injection.
- To protect patients, always use proper patient preparation when giving an injection, and be sure that you handle IV fluids and multi-dose vials correctly.

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 SAIDEEP HEALTHCARE & RESEARCH PVT. LTD.	SAIDEEP HOSPITAL	Doc No	SDH/CTVS/01
		Issue No	01
		Rev No.	02
		Date	1 JAN 2026
		Page	33
Cardiac Operation Theatre Manual			

7. LIST OF REGISTERS MAINTAINED IN THE O.T

1. OT Register
2. Re-scheduled cases Register
3. OT Culture file
4. Set Description Book
5. Inventory Register
6. C.S.S.D Register
7. Consumable Register
8. Valve Book
9. Narcotic Register
10. Duty Roster

Recommended By	Signature	Approved By	Signature
Dr.Hrishikesh kalgaonkar		Dr.S.S.Deepak	
Quality Head		Chairman & Managing Director	



Doc No	SDH/CTVS/01
Issue No	01
Rev No.	02
Date	1 JAN 2026
Page	34

Cardiac Operation Theatre Manual

OT PROCESS FLOW

