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Focus

Streamlining OT

Today hospitals are utilising OTs better by streamlining key areas of OT manpower, scheduling, layout, designing and technology, ***Sonal Shukla*** *finds out*

In any hospital, the Operation Theatre (OT) is said to be the primary source of revenue generation with around 50-60 per cent of revenue earned just by this area. This is more so for surgical specialities. The OT complex in a hospital also represents an area of considerable expenditure in a hospital budget and requires maximum utilisation to ensure optimum cost-benefit. In the best of hospitals, some 30-35 per cent of weekday OT capacity is not utilised, say experts. However, the situation is changing slowly. Today hospitals are keen on utilising OTs better by streamlining key areas like manpower, scheduling, layout and designing.

"Technological advances like minimally invasive surgery, which need costly equipment, payment based on diagnosis-related groups, captivated payment and discounted fee for service have all significantly reduced margins in the surgical business," says Dr Shabeer Ahmed, Gastrointestinal and Minimal Access Surgeon, Wockhardt Hospitals, Bangalore.

Various Strategies

"The list of people to be operated should be scheduled in such a way that surgical and anaesthetic time is synchronised"

- Dr G Bakthavathsalam
Chairman
K G Hospital

Coimbatore

"Posting elective surgeries as a cluster on fixed days is an option rather than spreading them over many days"

- Dr Anup Chirayath
Medical Director
Ahalia Foundation Eye Hospital
Palakkad

Establishment of operating room rules and regulations, strict adherence to and enforcement of approved policies and procedures along with continuous monitoring are said to be the essential ingredients for efficient OT management. "Operating time is money and it is to be emphasised that efficiency in the operating room is encouraged. Effective operating theatre utilisation for every hospital should be calculated. Every effort must be made to reduce the number of 'idle theatre hours'," insists Dr Ramkumar Raghupathy, Dean, G Kuppuswamy Naidu Memorial Hospital, Coimbatore.

According to Dr EK Ramdas, Consultant Anaesthesiologist and HOD Anaesthesia, Baby Memorial Hospital, Calicut, maximising the contribution margin is the goal of the hospital's strategic planning. The contribution margin per day is the daily revenue generated by the operating room, less all of the charges of daily labour and consumable costs. "To increase profitability, we need to increase the number of lucrative cases, rather than encouraging surgeons to do more cases at discounted rates," opines Dr Ramdas.

Data collection, monitoring and analysis are keys to OT utilisation, believes Dr Sujata Malik, Medical Superintendent, Ruby Hall Clinic, Pune. "An assessment of historic data of surgeries conducted in a hospital gives us vital information on how to distribute the work in various OTs. Market research to analyse trends and overall focus areas could provide further pointers for OT allocation. Good planning will result from analysis of retrospective and prospective data," she enumerates.

Scheduling: Proper and judicious scheduling of cases and adhering strictly to schedule is important, as poor scheduling is often said to be the cause of lost OT time.

"The list of people to be operated should be scheduled in such a way that surgical and anaesthetic time is synchronised, e.g. patients with infection should be operated in the end, so that they do not contaminate the theatre," says Dr G Bakthavathsalam, Chairman, K G Hospital, Coimbatore.

To more efficiently operate a surgical setting, managers may consider centralising scheduling to the OT suite itself. Ideally, holding patient and surgeon preferences constant, an operating facility can identify cases and appropriately place them into predetermined time slots, or blocks. "Case scheduling or correctly selecting the day on which to do each elective case so as to best fill the allocated hours is most important; much more so, than for

example, correcting errors in predicting how long elective or add-on cases would last, reducing variability in turnover or delays between cases, or day-to-day variation in hours of add-on cases," says Dr Ahmed.

According to him, as the majority of operative time is a combination of elective and imminent surgeries, although a smaller percentage, emergency surgical cases must always be handled promptly in order to ensure patient safety. Emergency surgeries are often unforeseeable and present a scheduling challenge as a result. Therefore, from a management perspective, one can use the elective and imminent surgical cases as a guideline for pre-determining operative schedules, while allowing flexibility for the emergencies that inevitably arise. "Posting elective surgeries as a cluster on fixed days is an option rather than spreading them over many days," opines Dr Anup Chirayath, Medical Director, Ahalia Foundation Eye Hospital, Palakkad.

G Kuppuswamy Naidu Memorial Hospital has streamlined the cardio-thoracic operating theatres. "We have recorded a considerable profit in the previous quarter and this was largely due to the discipline and working practice of the surgeons who ensure that the operating list is planned well in advance and the timing adhered to, avoiding unnecessary cancellations," shares Dr Raghupathy.

Experts stress allocating the right amount of OT time to each service on each day of the week so that rarely do services fill their allocated OT time and leave another case to schedule. This allocation is based on historical use by surgeons and then using computers to minimise the ratio of underutilised time and over-utilised time (which is more expensive). "Every surgeon should be allotted sessions and audits should be conducted on a monthly basis. The amount of time allotted to a surgeon should be tabled against the amount of time he actually operates in a theatre. This allows us to reschedule sessions, avoid under utilisation of one area and over-running of other theatres," says Dr Raghupathy.

Dr Manju Bhutani, Consultant Anaesthetist, PD Hinduja Hospital, Mumbai feels that since in any OT the work fluctuates depending upon the surgical members that it has, therefore every hospital must note its trend or pattern of work and then allot the available space accordingly to its surgeons.

Wockhardt Hospital, Bangalore (Case Study)

Monthly Assessment: The OT quality team meets monthly to assess the turnaround time and efficiency of the OT as assessed by the number of hours the OT was utilised daily, weekly and monthly. The most sensitive of the issues concerning delays is related to last minute cancellation of cases, delayed arrival of the patient to the OT, and delay in conduct of operation and transfer of the patients. These operational issues are discussed threadbare in the presence of the 'quality team'. On an average, the operating rooms work 7.5/ 10 hours daily, which was about 5.5 / 10 hours couple of years ago. "We are assessing some software which will track the movement of the patients from the word 'go' to augment efficient patient movement. This software also act as an information system using the HIS. SMSes are sent periodically to apprise the operating surgeons of their impending cases. This is now managed by the OT clerk, who does it manually," shares Dr Murali Chakravarthy, Chief of Anaesthesia, Critical Care and Pain Relief, Wockhardt Hospitals, Bangalore.

'Managing' the OT list: The OT manager discusses the proposed movement of the patient from the ward to OT and out to Post Anaesthesia Care Unit (PACU) a day prior. Optimal utilisation of additional equipment such as C arm (for intra-operative screening by X-ray), endoscopes, videoscopes, and cameras is planned. If necessary, other users of the same equipment such as endoscopy and radiology are informed well ahead about the need for these in the operating room. At the hospital, OT typically utilises these in the mornings and the others use them in the afternoon, thus avoiding conflicts and improving efficient utilisation. The OT clerk informs the ward well ahead of time about the proposed time of surgery and the patients are 'triaged' in the PACU, so that the final phase of transfer takes no more than five minutes.

Sensitisation of the personnel: Typically about five to seven teams are involved in patient transfer from wards until the patient reaches the OT. These teams are informed of the outcome of the OT quality team's decisions. Modifications in the practices are always carried out in close consensus with the OT team involving the surgeons, anaesthesiologists, nurses and the housekeeping.

Wastage prevention: Major contributors towards wastage are disposables, electrical power (operating the AC, laminar flow, lighting), and manpower. The in-house pharmacy cum stores keeps a watch on sudden spurt in the use of certain disposables, which is analysed. Every department is encouraged to get involved in the process of cost cutting, without compromising the quality and safety of patient care. Cost cutting of expensive inhalational anaesthetic agents is a case in point. "We switched over to completely closed circuit anaesthesia via low flow anaesthesia and saved up to 60 per cent in the cost of procurement of inhalational anaesthetic agents," reveals Dr Chakravarthy.

"The grouping of theatres in the hospital ensures staffing and better training in a centralised fashion"

- Dr (Capt) Sunil Dhar
Additional MS

OT layout & flow: A good OT layout greatly helps in optimum utilisation as well as smooth functioning. A lot of time must be spent in the planning of the OT and this process should involve the architect, the OT nurse and the surgeons who intend to use the facility. Some provision must be made for easy expansion if necessary. Ahalia Foundation Eye Hospital has a well-planned OT complex where a significant number of changes in design were made before and during the construction phase. No toilets are constructed in the area.

Indian Spinal Injuries Centre
New Delhi

"Timely pre-anaesthetic assessment of the patient the previous day by the anaesthetist will go a long way"

- Dr J Damodharan
Medical Director
SRMC
Chennai

"A smooth unidirectional flow of patients with nurses at each level to monitor the movement greatly helps. It works almost on the assembly line principle used in manufacturing units, ensuring a smooth and efficient flow of cases. We thus manage to do around 40-50 surgeries per day," Dr Chirayath reveals.

According to Dr H Paramesh, Medical Director, Lakeside Hospital, Bangalore, OT should be placed away from the crowd, but should be easily accessible to the emergency room and ICU. Delhi-based Indian Spinal Injuries Centre has a complex of five OTs of modular nature. Three OTs are earmarked for specialised surgeries and two are used for general surgeries. The pre-operative facility and post-operative ICU are located in the same complex to ensure post-operative patients are under the direct medical care of surgeons and anaesthetists. "Post-operative ICU ensures that patients requiring post-operative critical care are immediately taken care of and spillover to main ICU is minimal. Pre-anaesthetic check up and counselling facilities for patients and attendants are available within the OT complex. The grouping of theatres in the hospital ensures staffing and better training in a centralised fashion. It further minimises cancellation of OT schedules, helps in infection and cross infection control and gives the hospital flexibility of expansion at times of future demand," states Dr (Capt) Sunil Dhar, Additional Medical Superintendent, Indian Spinal Injuries Centre, New Delhi.

"In any hospital design of the OT, it is necessary to trace the patient's movement throughout the reception area, to the waiting area and the OT, following which the patient will be taken back to the recovery area and when he is comfortable, he goes up to his room. This entire patient movement needs to be streamlined so that it's comfortable, convenient and safe. This will improve the OT utilisation in the long run," feels Dr Vinod Chandiramani, HOD, General Surgery, PD Hinduja Hospital, Mumbai.

According Dr Vivek Desai, MD of HOSMAC India, "Putting things in

corridors should be avoided. A hospital should have proper storage so that retrieval will be easy and fast. The corridor width should be minimum 8 feet and ideally 10-12 feet."

Manpower: Staffing of the operating room, in terms of anaesthetists, nurses and other support staff is important for efficient running of theatre and this number should be on par with the clinical activity. Experts also feel that the way forward in operation theatre management is to have a 'Theatre Management Group' with strong leadership and appropriate membership with authority to take action. Theatre managers should monitor the actual use of operating room and co-ordinate with the surgeons, anaesthetist and other theatre personnel. The importance of each activity should be known to all and most importantly all the activities should be documented and periodically monitored.

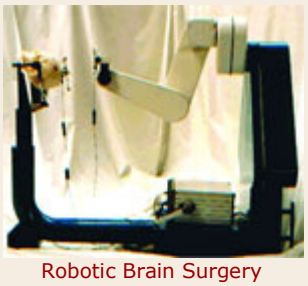
"A good surgical registrar is a must. His responsibility begins when a surgical patient comes to emergency room. He should see that the patient is admitted and all arrangements are made in such a way that he understands the need for surgery," believes Dr Paramesh.

Indian Spinal Injuries Centre has a dedicated OT coordination committee, which meets regularly to get inputs from the OT users.

Dr Chakravarthy believes in having a dedicated staff with designated duties. According to him, it is not a good idea to 'multi task' the staff in the OTs. Dedicated staff performing specific duties not only improves efficiency, but also increases job satisfaction. It is a common practice in India for nurses and the technicians to multi task in cleaning the equipment, the floor and the walls of the OTs in tandem with other administrative staff.

At Wockhardt Hospital, Bangalore, OT nurses only do nursing-related jobs. "We have a separate team of 'boys' who do the cleaning and sterilisation of the OT walls and floors. They go from one OT to another doing this job repeatedly. At regular intervals, their efficiency in handing back the OT in 'ready' state is assessed. Incentive-oriented training offered to them has made efficiency the buzz word and brought attrition to an all-time low," shares Dr Chakravarthy.

Newer Trends


Robotic Brain Surgery

Smart Operation Theatre: Today the concept of Smart Operation Theatre is becoming popular, which promises to make operations faster and more efficient and dramatically increase productivity and reduce fatigue in the OT. Here the surgeon issues voice commands that are interpreted by an automatic speech recognition system, and control an integrated network of Smart OR devices. A voice controlled set of medical devices is being created so that the surgeon's verbal commands can guide the activity of the OT. "The systems are being designed as open systems to enable working with a wide range of medical devices of different manufacturers and an industry standard is being established for communication between different devices," says Dr Chirayath.

Ultra-sterile OTs with laminar airflow and positive pressure ventilation combined with the use of HEPA filters has reduced infection rates drastically. The latest equipment is being used quite freely in the West. Many minor surgeries are done in the OPD itself to reduce congestion in the OTs.

Robotic surgical systems: They are used abroad as they reduce the complications of surgery. They involve three robotic arms placed at the operating table, a computer controller and an ergonomically- designed surgeon's console. One robotic arm is used to position the endoscope and the other two devices manipulate surgical instruments. This technique results in precise, minimally invasive surgical procedures.

In the West, some hospitals adopt Time-Motion analysis of operation time to arrive at cost and bill patients accordingly. "Operating theatre information system is used in the West: This is designed to provide information on the workload, case type and medical personnel involvement applicable to theatre managers, anaesthetists and surgical staff," shares Dr Bakthavathsalam.

Day Care Surgery: The strategy of imparting good day care service to the patients generates revenue for a hospital. This is a cost saving technique as it gives quick turnover with low staff requirement and less OT cost. Agrees Dr Murad Lala, Consultant Surgical Oncologist, PD Hinduja Hospital, "Utilising a hospital's OT also depends on its bed strength, because if it doesn't have beds to admit the patient, it cannot utilise the theatre. Therefore if the hospital has a separate day care centre, the patient comes in the morning, uses the facility and leaves by the afternoon."

To optimally use the OT area, Delhi's Moolchand Medcity focuses on the concept of day-care OTs. "Working people prefer to have weekend procedures. To support this demand of the patients, we have a day care OT complex which is used for all types of operations. Rare cases (about one in ten) are admitted and are kept in the post-operative room for further observation and monitoring," says Dr Vijay Langer, Senior Consultant, Anaesthesia, Moolchand Medcity

Time, Cost and Technique

"Correctly selecting the day on which to do each elective case so as to best fill the allocated hours is most important"

- Dr Shabeer Ahmed
GI & Minimal Access Surgeon
Wockhardt Hospitals
Bangalore

"Conducting cases back-to-back and shutting down the OTs results in decreased stress on the infrastructure"

- Dr Murali Chakravarthy
Chief of Anaesthesia
Critical Care and Pain Relief
Wockhardt Hospitals, Bangalore

It is important to minimise the time between surgeries. According to Yeo Eng Lam, Business Development Director, Johnson Medical, going for multispecialities per OT will increase usage, as the turnaround will be faster. Standard equipment is fixed on ergonomically positioned pendants (boom arms) and only specialised equipment needs to be rearranged for each case. On the other hand, orthopaedic, cardiac, transplant and neuro cases may be most sensitive to sharing of OT with others. These are also more equipment intensive, hence grouping their OT may be useful as they too take up longer hours. This will not hold up others.

The OTs in Mumbai-based PD Hinduja Hospital, however, are designed in such a way that any OT can be used for any surgery. Says Dr Bhutani, "Normally every speciality needs specific equipment and by and large hospitals allot different OTs for different surgeries. But by making all our OTs ultra clean and the same in terms of lights, tables, environment and air conditioning we are not wasting operating room time for cleaning and shutting down machines. So, wherever the work is, we are able to accommodate all our OTs simultaneously."

Pre-operative clinics well in advance of surgery reduce unused operating room time resulting from cancellations. Initiating room clearance before the patient has left the room, or induction of anaesthesia during operating room setup can also help. "Induction rooms can be utilised that permit anaesthesia to be administered prior to arrival in the OT," opines Dr Ramdas. Most OTs are empty after 5 pm and hospital schedule for surgery to be conducted during off hours by lowering hospital fees.

Dr J Damodharan, Medical Director, Sri Ramachandra Medical Centre, Chennai feels that timely pre-anaesthetic assessment of the patient the previous day by the anaesthetist will go a long way in improving the overall utilisation of the OT. "If the anaesthetist assesses the patient the previous day completely then that can avoid a lot of delays. The patient will be in the OT on time the next day with all the assessment issues clear," he says.

Wockhardt Hospital, Bangalore has been following 'pack' the OTs and shut down policy for many years. According to Dr Murali Chakravarthy, Chief of Anaesthesia, Critical Care and Pain Relief, Wockhardt Hospitals, Bangalore, it is a viable idea to conduct cases back-to-back and shut down the OTs. This results in decreased

stress on the infrastructure such as electrical power, air conditioning and laminar flow system. Not following this method results in unnecessary running of this essential equipment, which increases the running costs. "Running all the available OTs to complete the list allows the staff to perform other duties such as preparing items for the cases during the week, get the maintenance department to attend to malfunctions and servicing of equipment. This reduces the 'down time' of the equipment, thus improving its efficiency. When the OTs are shut down, except the airflow in the laminar airflow system, all other electrically operated equipment is shut down," shares Dr Chakravarthy.

Experts also suggest the use of cable management system to avoid time spent on disconnecting and reconnecting monitors. Adding personnel to the OT team will allow non-operative tasks to be accomplished more quickly. Acute pain service can reduce costs of surgical procedures significantly.

Newer technologies minimise surgery time and ensure precision, thereby reducing morbidity and mortality rates significantly. "It is also important to integrate information technology with theatre management applications which will assist the theatre manager, anaesthetist, surgeon, other OT personnel to schedule theatre session, collect pre and post operative data, generate OT/OR reports and statistics, and track and schedule theatre,"Dr Raghupathy avers. Modern neuromonitoring can help to avoid unnecessarily deep levels of anaesthesia and to achieve rapid recovery from general anaesthesia. This saves money and theatre time. Fast-tracking procedures allow the patients to bypass the post-anaesthesia care unit. "Video recording of procedures helps in reviewing the procedure, and comes in handy for future reference. In addition, it goes a long way in teaching activities, telemedicine and video conferencing," Dr Dhar adds.

Challenging Path

The emphasis especially in a country like India should be on providing a safe OT, especially in terms of reduced infection rate and avoidable morbidity and mortality. "Surgical skill wise we may be second to none but many of our OTs especially in rural and semi urban areas may not be really safe. The staff might not be well trained, the equipment may not function well and sterility principles may not be followed due to lack of proper training, documentation and monitoring," warns Dr Chirayath. Accreditation bodies like NABH and JCI also stress the safety part of Indian hospitals.

Minimally invasive surgery demands that high cost equipment be maintained in the OT and that the OT should be supported by a strong biomedical team to reduce the downtime of equipment. Misconceptions about infection control practices and sterility

abound in most hospitals. A good infection control programme as advocated by accrediting authorities would go a long way in removing the misconceptions.

Some hospitals fumigate after each case, every day, every week. Using ultraclean surgical environment will give a constant air washing effect, maintain low bacteria count, and assure surgeons of clean environment and hence faster turnover of cases. A better maintained OT gives 20 per cent higher throughput due to faster turnaround time for the next case.

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