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INTRODUCTION

A Catheterization laboratory or Cath lab is an examination room in a hospital or clinic with diagnostic imaging equipment used to visualize the arteries of the heart and the chambers of the heart and treat any stenosis or abnormality found. Most Catheterization laboratories are "single plane" facilities, those that have a single X-ray generator source and an image intensifier. The latest digital Cath labs are biplane (have two X-ray sources) and digital, flat panel labs.

Cardiac Catheterization" is a general term for a group of procedures that are performed using this method, such as coronary angiography, as well as left ventricle angiography. Once the Catheter is in place, it can be used to perform a number of procedures including angioplasty, PCI (percutaneous coronary intervention) angiography, balloon septostomy, and an Electrophysiology study or Catheter ablation.

Package payments began as early as 1984 when The Texas Heart Institute under the direction of Denton Cooley began to charge flat fees for both hospital and physician services for cardiovascular surgeries.

Package pricing, is defined as the reimbursement of health care providers (such as hospitals and physicians) "on the basis of expected costs for clinically-defined episodes of care. It has been described as "a middle ground" between fee-for-service reimbursement (in which providers are paid for each service rendered to a patient) and capitation (in which providers are paid a "lump sum" per patient regardless of how many services the patient receives).Package payments have been proposed in the health care reform debate in the United States as a strategy for reducing health care costs, especially during the Obama administration.

A key factor for a more rapid move towards universal health coverage is the efficient use of resources, coupled with increased resource mobilization and improved pooling. Substantial efficiency gains could be made by reforming hospital payment mechanisms.

An effort has been made to study each and every aspect of that factor which contributes towards the cost of any procedure carried out in Cath lab. Cost of each part is then pooled together to arrive at actual costing to the hospital and finally compared with the charges of the package offered to the patient.

GENERAL NORMS FOR THE CATH LAB

a. Location of Cath Lab

The Cath lab should be located in such a way that it is not located near the area where patient and other movement is high. It should be easily assessable from O.T, SSD, and Cardiac Care Unit. Its location should not be on ground floor but easily approachable from Emergency. Preferably there should be separate lift and staircase for this complex.

b. Power supply system

There should be a separate power back-up system (UPS) for Cath lab in case of main supply failure and to cater for delay in generators start-up. Moreover the supply to Cath Lab should be filtered for any spikes and voltage fluctuations.

c. Staff

It should have staff specially trained & experienced in all the procedures carried out in the Cath Lab. 25% extra staff should be on payroll to cater for leave, emergencies and for un-interrupted functioning of Cath Lab.

d. Financial Strategy

Owners and physician/users of cardiac Catheterization labs (Cath labs) may be missing out on an opportunity to increase their respective cash flows and to further enhance their business relationships with each other. The use of lease agreements and purchased services agreements can provide the mechanisms to enhance revenues, more fully utilize facility resources, prevent the loss of cardiac care patients to competing facilities, and avoid costly and duplicate capital outlays.

e. Inpatient versus outpatient setting for procedures

Although outpatient procedures have become common there is less uniformity in patient and parent suitability for hospital discharge shortly after Catheterization than in adult patients. Infants and young children cannot be instructed or expected to remain still without moving their legs for a period after a procedure. used in adults. For these reasons,

it is suggested that overnight observation be anticipated and allowed whenever there is any concern about patient safety.

Nonetheless, a set of written criteria should be established for same-day Catheterization and discharge . These criteria would account for differences in procedure type, patient age and expected compliance, parent or guardian reliability, travel distance, procedure duration and time of completion, and the cardiac physiology in determining which patients are eligible for discharge on the day of Catheterization.

f. Quality management

Quality management in the Catheterization laboratory must include: 1) an effective and ongoing educational program in the diagnostic use of X-rays, 2) accurate monitoring and timely reporting of personnel exposure, and 3) modification of procedural conduct in those cases where exposure levels are of concern. These issues are addressed earlier in this document (see QA Issues in the Cardiac Catheterization Laboratory).

g. Minimum caseload volumes

The use of a specific minimum number of cases to define the quality of operator performance is obviously fraught with problems. There have been no data to justify the prior recommendation of at least 150 cases/year. The minimum diagnostic caseload for the entire laboratory also varies widely from state to state.

In general, the minimum interventional caseload of 75 procedures/year for operators and a minimum performance of 200 cases/year by institutions, with the ideal being 400 cases/year per laboratory, both reasonable and supportable.

Issues of training, competency, and operator volume are important.

h. QA issues in the cardiac Catheterization laboratory

The modern cardiac Catheterization laboratory is an amalgamation of complex, highly sophisticated medical and radiological instrumentation used in the diagnosis and management of patients with not only chronic stable disease, but also acute life-threatening illnesses. In any complex, procedure-oriented area, it is necessary to have a

well-organized program of QA that focuses on individual and laboratory outcomes. In addition, a continuous program of quality improvement (QI) should be implemented to provide ongoing feedback and structure for change. The required components are: 1) clinical proficiency, 2) equipment maintenance and management, and 3) a QI process and 4) radiation safety.

HOSPITAL PROFILE

a. Introduction

Soni Manipal Hospital is first hospital in the group which started in 1986 as a 20 bedded Nursing Home and by 1996 it had expanded to Rajasthan's first 100 bedded corporate hospital. This state of the art multi-specialty hospital now also provides super-specialty services such as Cardiology, CTVS, Oncology (Cancer), General and Advanced Laparoscopic Surgery, Critical Care and numerous others specialties.

Founded by eminent **Dr.B.R.Soni**, the institutions have been envisioned with the aim of bringing to Jaipur the highest standards of medical care along with clinical research, education and training.

Soni Group is governed under the guiding principles of providing medical services to patients with care, compassion, commitment. Since its inception in 1986, the Soni Group has been the pioneer that has completely re-defined the healthcare scenario of Rajasthan.

Soni Manipal Hospital Constructed in a small span of 15 months and operational from Oct 2004, this hospital is now one the top class healthcare institutes in northern India. Spread across, extensively over **an area of 2,55,000sq. ft., Soni Manipal Hospital** is the first of its kind in private sector to be approved by the state government for medico legal Services. It is also the largest Hospital in Rajasthan accredited with both **NABH & NABL**. The institute includes a research center, nursing college, nursing school and some minor medical school diploma courses. It has 315 beds with proposed capacity of 600 beds and over 120 critical care beds with 09 operation theatres catering to over 20 specialties Soni Manipal Hospital houses six centers of excellence which will provide medical intelligentsia, cutting-edge technology and state-of-the-art infrastructure with a well-integrated and comprehensive information system.

Soni Manipal Hospital is the first private hospital in Jaipur to handle Trauma and Medico-legal cases related to accidents and injuries. This state of the art hospital is equipped with all modern world class equipments and facilities. Featuring multi-specialty and super-specialty departments, we provide premier healthcare to all. A Team of 60 renowned consultants headed by 5 ex-principals & HOD's of medical Colleges are affiliated to serve patients and their respective needs. Soni MANIPAL Hospital provides treatment in over 60 different specialities including Cardiology, CTVS; Oncology (Cancer); General and Advanced Laparoscopic Surgery; Critical Care; Neurosciences;

Orthopedics, Polytrauma, Joint Replacement and Sports Medicine; Gastrosiences and numerous others specialties.

b. Location

Located in Jaipur, situated in Sector 5, Main Sikar Road, Vidhyadhar Nagar immensity of size immediately distinguishes it from rest of the surrounding.

c. Philosophy

The Hospitals philosophy is " **Kaare Zindagi Ki Baat ... Hamare Saath**" or " **Your Life ... We Care**"

d. Mission

We aim to provide world class healthcare at affordable rates to all members of the public.

e. Vision

To provide Quality health services with technological perfection and personal care under one roof with highly well equipped infrastructure by competent and devoted professionals at affordable cost that is inexpensive and accessible to everyone in an ethical and hygienic environment.

Achievements

Outdoor Patients	over 2,50,000 patients.
Indoor Patients	over 40,000 patients.
Free Patients	over 50,000 patients.
Pathology Diagnostics	over 800,000 tests.
Radiology Diagnostics	over 100,000 studies done.
Blood Bank	over 25,000 Blood units processed.
Cardiology	Over 10,000 Angiographies Over 2,000 Angioplasties Over 2,000 Heart Bypass surgeries,

	Over 10,000 non-invasive procedures.
	Over 15,000 dialysis patients served
Urology	Over 750 procedures
Oncology	Over 10,000 cancer patients treated
	Over 15,000 radiotherapy cases
	Over 2,000 cancer surgeries.
	Over 1,000 cancer patients have been treated free of charge including drugs in the institute
Gastrosciences	over 10,000 invasive procedures
ICU cases	Over 100,000 ICU bed days of ICU services have been provided
Average Length of Stay	Very short and overall stay on an average about 4.15 days per admission
Longest Stay	Shri Vineet Malpani stayed with us for over 240 days (he is alive today)
No. of CT Scans Done in a single day on one machine	239 scans in 24hrs for 220 patients on a single CT Scan

f. Milestones Achieved by SONI hospital

- ➡ Leaders in ICU Care: We have the highest Critical care Standards and maximum number of ICU beds with lowest infection rates
- ➡ Leaders in Cardiology & Cardiac Surgery: We are the only center in the state which performs Roto-Blator technique
- ➡ Leaders in Neurosciences: With Dr. S. R. Dharkar at our helm, we have the best Neurosurgery unit with 1st Modular Neuro Suite
- ➡ Leaders in Oncology: With our existing infra-structure, daycare ward and Primus Dual Energy Linear Accelerator & HDR Brachytherapy, we have most advanced cancer center in the state

- ➡ Leaders in Nephrology: We are doing over 400 dialysis cases a month and have advanced techniques such as CRRT
- ➡ Leaders in Joint Replacement: We have performed the maximum number of Joint replacement surgeries in the state. We did the 1st ACL, the 1st bi-lateral joint replacement & the 1st THR+TKR.
- ➡ Amongst top in Gastroenterology and GI Surgery: We are doing most procedures laproscopically including advanced bariatric surgery for obese patients.
- ➡ Experts in Trauma: We are regularly admitting Trauma cases and have a Trauma-care team also.
- ➡ Leaders in Radio Imaging: with the 1st CT Scan and 1st MRI in Rajasthan in 1992 and 1993, not to mention the 1st digital MRI in India in 2012 and a world record number of cases being done daily in SMS medical college. Soni group is the clear leader in Imaging in Rajasthan

g. Specialties offered

Oncology, Cardiac Diseases, Renal Diseases, Neonatal, Pediatric /Medical & Cardiac Intensive care, Orthopedics, General Surgery, Nephrology, Endocrinology, Gastroenterology, General Medicine, Gynecology, Pediatrics, Laboratory Medicine, Neurology, Ophthalmology, Radiology, Pulmonology, Urology, Aesthetic & Cosmetic Surgery, Dermatology, Pulmonary Medicine, ENT, Physiotherapy, Critical care, Dental, Alternative Medicine.

SUMMARY OF THE JOB

- Worked as a team member in Cath lab .
- To study the day to day functioning and various other managerial aspects of Cath lab.
- To find out the actual cost incurred to hospital on various procedures carried out in Cath lab

The following are the responsibilities assigned to me by the organization

- To gather the information about the functioning of Cath Lab
- To collect information on various equipments used in Cath Lab
- To study the Patient flow in Cath lab for various procedures
- To calculate the actual cost of various heads involved in a procedure in Cath Lab
- To find out the time of various procedures in Cath Lab
- To compare the actual cost of a procedure from what is charged from a patient.

ISSUES IN CATH LAB

a. Cardiac Catheterization is one of the most common invasive procedures performed. Although the benefits of cardiac Catheterization remain great, the large number of procedures performed coupled with infrequent but potentially significant complications make the cardiac Catheterization laboratory an important environment in which to constantly strive to improve quality. Although optimal patient outcomes remain paramount, state and national regulatory requirements, public reporting, and payers' interests in both outcomes and cost raise the importance of quality measurement and improvement in the cardiac Catheterization laboratory.

b. In a real-world setting, many administrators struggle to balance pinching pennies and delivering care. As hospital reimbursement dwindles and innovation blossoms, hospital staff must find creative ways to save a buck without skimping on care. Staff members from three hospitals share solutions ranging from data dissemination to innovation to physician engagement.

c. The cost of package can only be reduced by increasing the numbers of procedures in Cath lab and that too throughout the year. For this an effective marketing strategy needs to be there.

OBSERVATIONS OF THE CATH LAB

CAG package

- CAG procedures are about **63%** of total procedures with a buffer amount of **Rs 1506**.
- Hospital is not making any noticeable profit from CAG package (**17% only**). Total revenue generated in 2013 from this is **Rs 965346**.
- Major cost element in CAG procedures is stay in CCU and labour cost.

Cost element	Cost
Stay in CCU	Rs 2004 (24% of total cost)
Labour cost	Rs 1720 (20% of total cost)

PPI package

- CAG procedures are about **29.5%** of total procedures with a buffer amount of **Rs 2212**.
- Hospital is not making any noticeable profit from PPI package (**9.7% only**). Total revenue generated in 2013 from this procedure is **Rs 712264**.
- Major cost element in PPI procedures is stay in CCU and labour cost.

Cost element	Cost
Stay in CCU	Rs 12024 (53% of total cost)
Labour cost	Rs 4300 (19% of total cost)

PTCA package

- PTCA packages are about 33% of total procedures and is generating a fair amount of margin per procedure (about 240%). It's the major revenue generator procedure in Cath Lab.
- Revenue generated by PTCA package in year 2013 alone is **Rs 9636816**
- Major cost element in PTCA procedures is stay in CCU and consumables.

Cost element	Cost
Stay in CCU	Rs 8350 (41% of total cost)
Consumables	Rs 4418 (22% of total cost)

To reduce the overall cost of a procedure in a package payment method , hospital has to reduce the cost of stay in CCU and labour cost.

In today's world when number of people are increasing with heart problems specially at young age ,it becomes very important for a Hospital to critically analyze the cost of any package so that maximum benefits can be delivered to the patient at the minimum cost and with least hassles. Moreover such exercise will generate more revenue for the hospital by increasing the number of patient in- flow and give better competitive standing

CONCLUSION

- a. Cost management is one of the critical success factors for the hospitals. It provides information for strategic, operational, clinical and human resource decision making. Cost analysis would help to arrive at the cost of production of every unit by close analysis of expenditure. It indicates to the management any uneconomic use or waste which is thereby revealed. It also aids in pricing and to furnish data for decisions.
- b. The cost of services also influences revenue to the extent that they influence pricing decisions. Hospital must remain profitable in order to serve the community effectively and to embrace capital markets for plant and technology modernization.
- c. To reduce the overall cost of a procedure in a package payment method , hospital has to reduce the cost of stay in CCU and labour cost.
- d. In today's world when number of people are increasing with heart problems specially at young age ,it becomes very important for a Hospital to critically analyze the cost of any package so that maximum benefits can be delivered to the patient at the minimum cost and with least hassles. Moreover such exercise will generate more revenue for the hospital by increasing the number of patient in- flow and give better competitive standing