

Patient-reported outcomes in heart surgery

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ABSTRACT:The aim of this study was examine priority setting for cardiac surgery and to provide an overview of decisions and rationales used in hospital practice. Cardiovascular disease has become the leading cause of morbidity and mortality in India during the last 3 decades. The facilities of modern diagnostic methods and new proven techniques to offer symptomatic relief and improve their prognosis are available in most parts of the country. The lack of social security and health insurance for the large majority of the population, however, is a serious limitation. However, in the last few years serious efforts have been made to streamline these procedures. Indigenous research and scientific data acquisition in relation to the modern technology for achieving coronary revascularization has also started on a promising note.

Keywords: cardiovascular disease, facilities, security, insurance, revascularization

I. INTRODUCTION:

Heart surgery can correct problems with the heart if other treatments haven't worked or can't be used. The most common type of heart surgery for adults is coronary artery bypass grafting (CABG). During CABG, a healthy artery or vein from the body is connected, or grafted, to a blocked coronary (heart) artery.

Doctors also use heart surgery to

- Repair or replace heart valves, which control blood flow through the heart
- Repair abnormal or damaged structures in the heart
- Implant medical devices that help control the heartbeat or support heart function and blood flow
- Replace a damaged heart with a healthy heart from a donor

- Treat heart failure and coronary heart disease
- Control abnormal heart rhythms

Heart surgery has risks, even though its results often are excellent. Risks include bleeding, infection, irregular heartbeats, and stroke. The risk is higher if you are older or a woman. The risk is also higher if you have other diseases or conditions, such as diabetes, kidney disease, lung disease, or peripheral arterial disease.

Cardiac surgery, or cardiovascular surgery, is surgery on the heart or great vessels performed by cardiac surgeons. It is often used to treat complications of ischemic heart disease (for example, with coronary artery bypass grafting); to correct congenital heart disease; or to treat valves heart disease from various causes, including endocarditis, rheumatic heart disease, and atherosclerosis. It also includes heart transplantation.

TYPES OF CARDIAC SURGERY:

Open-heart surgery:

Open-heart surgery is any kind of surgery in which a surgeon makes a large incision (cut) in the chest to open the rib cage and operate on the heart. "Open" refers to the chest, not the heart. Depending on the type of surgery, the surgeon also may open the heart.

Dr. Wilfred G. Bigelow of the University of Toronto found that procedures involving opening the patient's heart could be performed better in a bloodless and motionless environment. Therefore, during such surgery, the heart is temporarily stopped, and the patient is placed on cardiopulmonary bypass, meaning a machine pumps their blood and oxygen. Because the machine cannot function the same way as the heart, surgeons try to minimize the time a patient spends on it.



Fig.1 Cardiac surgery at Gemelli Hospital in Rome.

Cardiopulmonary bypass was developed after surgeons realized the limitations of hypothermia in cardiac surgery: Complex intracardiac repairs take time, and the patient needs blood flow to the body (particularly to the brain), as well as heart and lung function. In July 1952, Forest Dodrill was the first to use a mechanical pump in a human to bypass the left side of the heart whilst allowing the patient's lungs to oxygenate the blood, in order to operate on the mitral valve. In 1953, Dr. John Heysham Gibbon of Jefferson Medical School in Philadelphia reported the first successful use of extracorporeal circulation by means of an oxygenator, but he abandoned the method after subsequent failures. In 1954, Dr. Lillehei performed a series of successful operations with the controlled cross-circulation technique, in which the patient's mother or father was used as a "heart-lung machine".^[17] Dr. John W. Kirklin at the Mayo Clinic was the first to use a Gibbon-type pump-oxygenator.

Modern beating-heart surgery:

In the early 1990s, surgeons began to perform off-pump coronary artery bypass, done without cardiopulmonary bypass. In these operations, the heart continues beating during surgery, but is stabilized to provide an almost still work area in which to connect a conduit vessel that bypasses a blockage. The conduit vessel that is often used is the Saphenous vein. This vein is harvested using a technique known as endoscopic vessel harvesting (EVH).

Heart transplant:

Norman Shumway is widely regarded as the father of human heart transplantation, although the world's first adult heart transplant was performed by a South African cardiac surgeon, Christiaan Barnard, using techniques developed by Shumway and Richard Lower. Barnard performed the first transplant on Louis Washkansky on 3 December 1967 at Groote Schuur Hospital in Cape Town. Adrian Kantrowitz performed the first pediatric heart transplant on 6 December 1967 at Maimonides Hospital (now Maimonides Medical Center) in Brooklyn, New York, barely three days later. Shumway performed the first adult heart transplant in the United States on 6 January 1968 at Stanford University Hospital.

Coronary artery bypass grafting:

Coronary artery bypass grafting, also called revascularization, is a common surgical procedure to create an alternative path to deliver blood supply to the heart and body, with the goal of preventing clot formation. This can be done in many ways, and the arteries used can be taken from several areas of the body. Arteries are typically harvested from the chest, arm, or wrist and then attached to a portion of the coronary artery, relieving pressure and limiting clotting factors in that area of the heart.

The procedure is typically performed because of coronary artery disease (CAD), in which a plaque-like substance builds up in the coronary artery, the main pathway carrying oxygen-rich blood to the heart. This can cause a blockage and/or a rupture, which can lead to a heart attack.

Minimally invasive surgery:

As an alternative to open-heart surgery, which involves a five- to eight-inch incision in the chest wall, a surgeon may perform an endoscopic procedure by making very small incisions through which a camera and specialized tools are inserted. In robot-assisted heart surgery, a machine controlled by a cardiac surgeon is used to perform a procedure. The main advantage to this is the size of the incision required: three small port holes instead of an incision big enough for the surgeon's hands. The use of robotics in heart surgery continues to be evaluated, but early research has shown it to be a safe alternative to traditional techniques.

Post-surgical procedures:

As with any surgical procedure, cardiac surgery requires postoperative precautions to avoid complications. Incision care is needed to avoid infection and minimize scarring. Swelling and loss of appetite are common. Recovery from open-heart surgery begins with about 48 hours in an intensive care unit, where heart rate, blood pressure, and oxygen levels are closely monitored. Chest tubes are inserted to drain blood around the heart and lungs. After discharge from the hospital, compression socks may be recommended in order to regulate blood flow.

RISKS:

The advancement of cardiac surgery and cardiopulmonary bypass techniques has greatly reduced the mortality rates of these procedures. For instance, repairs of congenital heart defects are currently estimated to have 4–6% mortality rates.

A major concern with cardiac surgery is neurological damage. Stroke occurs in 2–3% of all people undergoing cardiac surgery, and the rate is higher in patients with other risk factors for stroke. A more subtle complication attributed to cardiopulmonary bypass is postperfusion syndrome, sometimes called "pumphead". The neurocognitive symptoms of postperfusion syndrome were initially thought to be permanent, but turned out to be transient, with no permanent neurological impairment. In order to assess the performance of surgical units and individual surgeons, a popular risk model has been created called the EuroSCORE. It takes a number of health factors from a patient and, using precalculated logistic regression coefficients, attempts to quantify the probability that they will survive to discharge. Within the United Kingdom, the EuroSCORE was used to give a breakdown of all cardiothoracic surgery centres and to indicate whether the units and their individual surgeons

performed within an acceptable range. The results are available on the Care Quality Commission website.^{[35][36]}

Another important source of complications are the neuropsychological and psychopathologic changes following open-heart surgery. One example is Skumin syndrome, described by Victor Skumin in 1978, which is a "cardioprosthetic psychopathological syndrome" associated with mechanical heart valve implants and characterized by irrational fear, anxiety, depression, sleep disorder, and weakness.

RISK REDUCTION:

A 2012 Cochrane systematic review found evidence that preoperative physical therapy reduced postoperative pulmonary complications, such as pneumonia and atelectasis, in patients undergoing elective cardiac surgery. In addition, the researchers found that preoperative physical therapy decreased the length of hospital stay by more than three days on average.

A 2013 Cochrane review showed that both pharmacological and non-pharmacological prevention reduce the risk of atrial fibrillation after an operation and reduced the length of hospital stays. No difference in mortality could be shown. There is evidence that quitting smoking at least four weeks before surgery may reduce the risk of postoperative complications.

CORONARY ARTERY DISEASE IN INDIA- MAGNITUDE OF THE PROBLEM

Studies of Indian immigrants and cross sectional studies in India, have demonstrated that coronary artery disease (CAD) is rampant in Indians and that its prevalence is several folds higher than in industrialized nations. The Global Burden of Diseases (GBD) study reported the estimated mortality from CAD in India at 1.6 million in the year 2000. Extrapolation of this estimate shows the current burden of CAD in India to be more than 32 million patients. Epidemiological studies show a sizeable burden of CAD in rural (3-5%) and urban (7-10%) populations. A conservative estimate indicates that there could be 30 million CAD patients in India of which 14 million are in urban and 16 million in rural areas. If the current trend continues by the year 2020, the burden of atherothrombotic CVD in India will surpass other regions of the world.

Some peculiarities of CAD patterns stand out in Indian patients. These include: younger age at presentation, a high incidence of double (DVD) and triple vessel disease (TVD), diffuse involvement, distal disease and significant left

ventricular dysfunction at presentation. An angiographic study from Vellore in 1066 consecutive males admitted for CAD noted significant disease in 877 patients; of these, 55 per cent were <50 yr of age, 34 per cent were <45 yr of age and 12 per cent were below 40 yr of age. Although the mean age was 48 yr, TVD was more common (55%) than DVD (24%) and single vessel disease (24%) combined. Reports from New Delhi have confirmed the high prevalence of TVD. The high prevalence of TVD (35%) was also reported in non-smoking pre-menopausal women. An incidence of TVD in post-menopausal women was reported to be 57 per cent from another center. Another study from north India evaluated premature CAD. Though these patients had lower prevalence of diabetes and hypertension, smoking and family history of premature CAD was more common in comparison to older patients. Overall, the patient population had lower total cholesterol (TC) and LDL-C levels (as compared to the reported western literature) and high triglyceride (TG) and low HDL-C levels. Younger patients had a more atherogenic lipid profile as reflected by higher TC, LDL-C and TG levels. The angiographic profile also varied with age, with older patients having more diffuse disease and higher frequency of TVD. Amongst predictors of either TVD or sustaining myocardial infarction (MI), diabetes and TC/HDL-C ratio were the strongest predictors. However, these data are from tertiary centers and may reflect referral bias and show only the tip of the iceberg. Thus a large burden of CAD characterized by high severity and poor anatomy exists and threatens the Indian population.

The mortality attributable to CVD in India is expected to rise by 103 per cent in men and 90 per cent in women from 1985 to 2015. Even as CVD rates skyrocket, the availability of better cardiology facilities and dedicated cardiac centers have come as a welcome relief and India has seen a big leap in the fields of interventional cardiology and cardiac surgery in recent times. There are presently over 500 centers with facilities for coronary angiography and coronary angioplasty in the country⁹ and these numbers are steadily increasing (Fig. 1). Most metropolitan cities have these facilities available and even smaller cities are acquiring these at a rapid rate (Fig. 2). However, high treatment costs are a major hurdle for the economically deprived seeking medical help. They often have to rely on Government hospitals, which are situated in metros and have long waiting lists causing much unwanted delay in treatment. The difficulties encountered during interventional procedures and surgery often relates to late presentation, diffuse disease, small vessel disease and left ventricular (LV) dysfunction. Lack of an organized uniform health insurance policy for these expensive procedures is a major drawback for optimal utilization of these facilities. Patients with conditions like acute coronary syndromes, left main disease, symptomatic multiple vessel disease with left ventricular dysfunction are very often not able to avail these services because of these reasons. Even the long-term optimal medical treatment is availed by a relatively small number of patients because of lack of motivation, long-term cost and availability of good counselling.

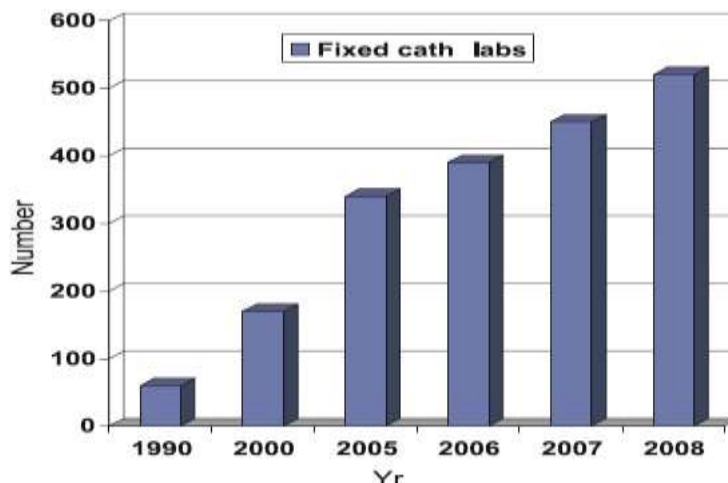


Fig.2 Growth of fixed cath labs in India



Fig.3 Distribution of cath labs in India

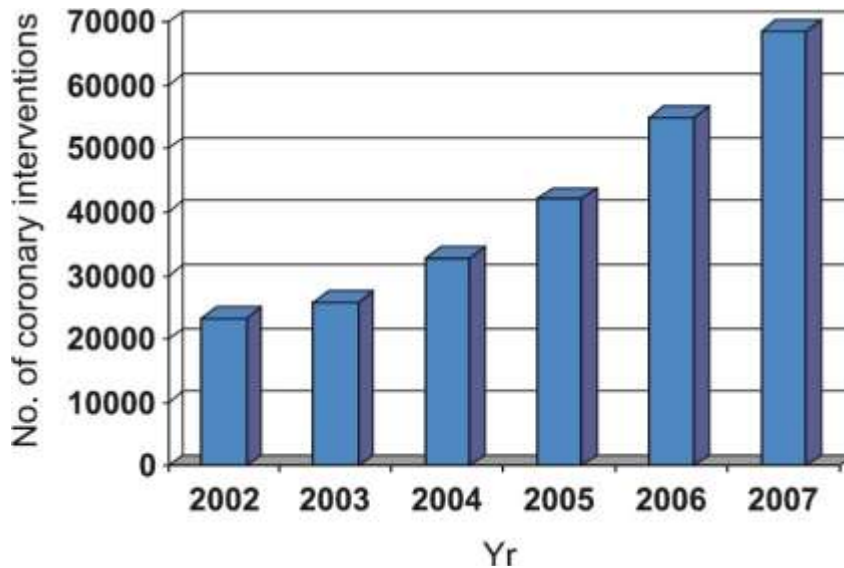
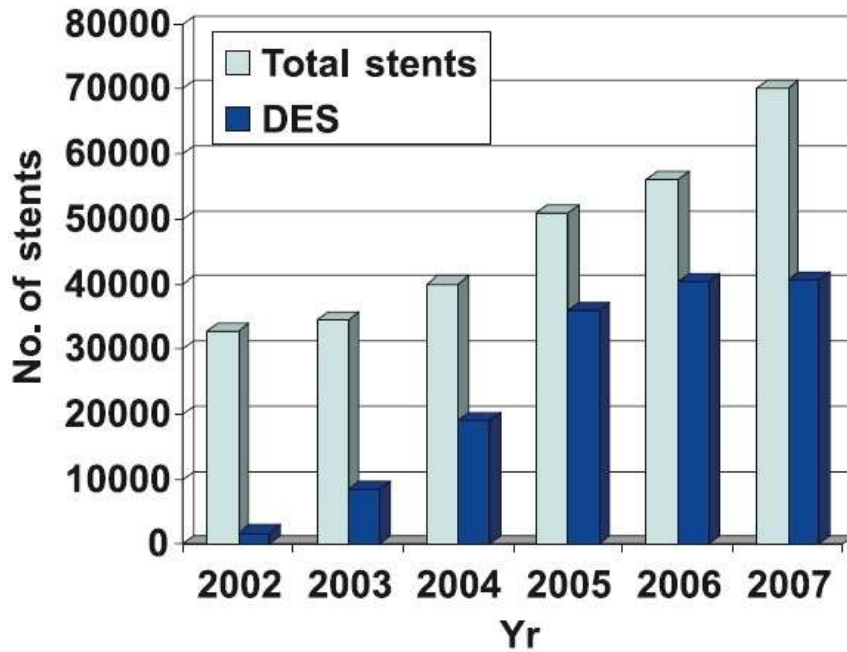


Fig.4 Total coronary interventions in India



	2002	2003	2004	2005	2006	2007
Total Stents	32686	34520	40,000	50980	56015	70114
DES	1715	8450	19000	28199	40397	40607

Fig.5 Total number of stents and drug eluting stents (DES) usage patterns in India

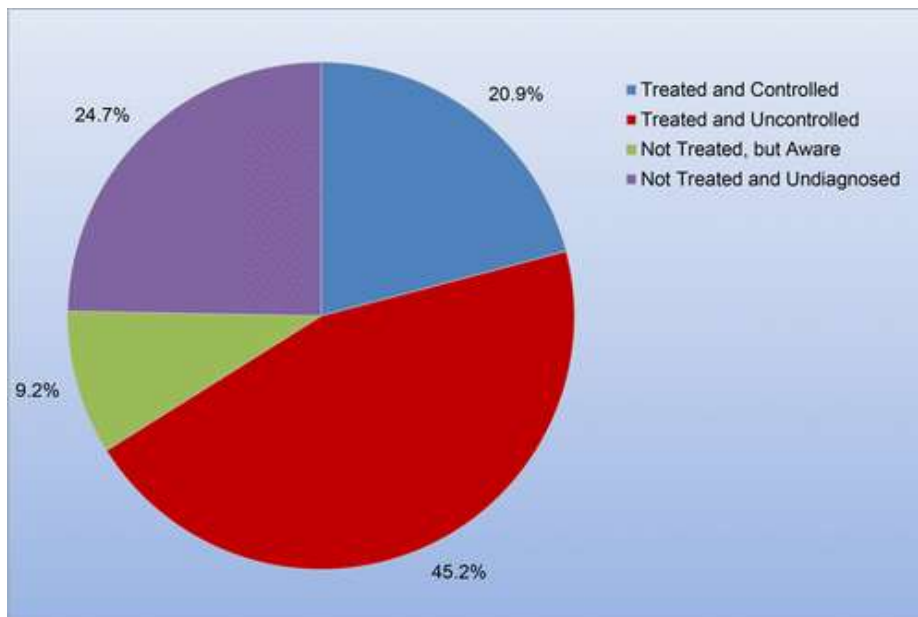


Fig 6.Heart Disease and Stroke Statistics—2019 Update

II. CONCLUSION:

Without a doubt, the evolution of cardiac surgery over the past 50 years has been tremendous. Much as the missions to the moon

sparked the development in so many other areas, cardiac surgery has been the same. Many of the procedures and therapies in cardiovascular medicine pay homage to the minds of the great

visionaries and in operating rooms all around the world. However, the advance in cardiac surgery that probably has had the greatest impact in medicine, and the delivery of health care is the dedication to reporting of outcomes and continuous quality improvement. Monitoring outcomes and

quality metrics in cardiac surgery through public reporting is a professional obligation to do not only what is best for the patient but also to continually refine our practice. Throughout the last 50 years, cardiac surgery has established this foundation and set the course.

Table 1:

S.NO	Did your heart failure prevent you from living a you wanted during the past month(4weeks)by-	NO	VERY LITTLE	VERY MUCH
1.	Causing swelling in your ankles or legs?			
2.	Making you sit or lie down to rest during the day?			
3.	Making your sleeping well at night?			
4.	Giving you side effects from treatments?			
5.	Making your working around the house or yard difficult?			
6.	Costing you money for medical care?			
7.	Making your working to earn a living difficult?			
8.	Making you eat less of the foods you like?			
9.	Making you short of breath?			
10.	Making you stay in hospital?			
11.	Making you <u>tired</u> <u>fatigued</u> or low on energy?			
12.	Making you <u>feel</u> a loss of self-control in your life?			

13.	Making you worry?			
14.	Making it difficult for you to concentrate or remember things?			
15.	Making you feel depressed?			

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