

Evolution and current status of interventional cardiology in India



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AsiaIntervention, a journal for our region, is a newcomer attempting to find a space in this wide area of readership, with so many established journals already being available. One of our objectives as editors is to make the readership aware of the developments which have occurred during the last four decades in countries of this region, which is the home for more than two thirds of mankind. Keeping this goal in mind, I thought of appraising our valued readers regarding the interventional cardiology scene in India.

Interventional cardiology, which is a subspeciality dealing with catheter-based treatment of structural heart disease, was conceptualised by Charles Dotter in 1964 and kick-started by Andreas Gruentzig more than a decade later. Soon after the pioneering work of Charles Dotter in peripheral artery dilatation, in 1966 Rashkind and Miller described a non-surgical procedure to create an atrial septal defect, using a balloon catheter in patients with transposition of the great vessels.

Non-surgical interventions have been progressively dominating the scene in the management of obstructive coronary artery disease, management of cardiac arrhythmias, and congenital heart disease, and are also encroaching on the field of valvular heart disease. Technological advances, innovative techniques, unique imaging techniques and increased operator experience have gone a long

way to make these non-surgical procedures widely acceptable with high success and low complication rates. Percutaneous interventions have thus grown by leaps and bounds all over the world, India being no exception.

Era of interventional cardiology in India

As a stepping stone for the creation of an interventional cardiology programme, a cardiac catheterisation laboratory is a prerequisite. In 1962, Dr Sujoy B. Roy from the All India Institute of Medical Sciences, New Delhi, and Dr V. Lingam from the Christian Medical College, Vellore, started the first organised cardiac catheterisation programme in India. Selective coronary angiography was initiated in India in the late seventies. The coronary angioplasty programme in the country started in April 1985 with Dr B. Soma Raju from Hyderabad taking the lead.

Following this, several centres started performing coronary balloon angioplasty. In 1985, the National PTCA Registry of India was created by the author and his colleagues in order to document the number and type of procedures, operators and centres performing percutaneous coronary interventions (PCI). Publication of these data began in 1992. In that year, 3,398 PCI were performed in India by a total of 84 cardiologists in 103 centres. In 1993, the National

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PTCA Registry of India issued its first set of guidelines for performing percutaneous transluminal coronary angioplasty. The number of PCI procedures went on increasing steadily and at the last count had reached around 250,000, showing substantial growth.

Salient points of the PCI programme in India

1. More than 250,000 PCI are performed per year in nearly 600 centres.
2. More than half of the centres do not have on-site surgical capability.
3. Women constitute 25-30% of the total procedures performed.
4. 10% of the PCI are performed in patients younger than 40 years.
5. 20% of PCIs are primary PCI for STEMI.
6. PCI is performed in a single artery in about 60% of cases.
7. Radial route is used in about 50% of cases.
8. Reuse of material for procedures is common (about 95%).
9. The patient has to bear the cost of the procedure in at least 50% of instances.
10. 40% of the total stents used are indigenously produced.
11. 83% of the stents used are drug-eluting.
12. Rotablation is used in <1% of cases.
13. Fractional flow reserve (FFR) guidance is currently used in <5% of procedures.

(This information has been obtained through the National Interventional Council, a part of the Cardiological Society of India)

The practice of interventional cardiology

The practice of interventional cardiology is changing in India. Across India, there is an increase in the number of diagnostic and interventional coronary procedures. The number of centres and operators is steadily increasing. Coronary intervention, however, still remains the dominant procedure in vascular interventions in India (nearly 90% of all therapeutic catheter-based procedures), and the number of procedures is growing significantly.

The indications for PCI remain centred around acute coronary syndrome (ACS) in the majority of cases. This may be due to the phase of epidemiological transition in India, where ACS outnumber chronic stable disease. This is a cause for concern. Most metropolitan cities have PCI facilities available and even smaller cities are acquiring these at a rapid rate. There has been an annual 20% growth in coronary procedures in India for the last five years compared to the western world where PCI numbers are stagnating due to better preventive measures and greater emphasis on appropriateness criteria. Lack of an organised uniform health insurance policy for these expensive procedures is a major drawback for the optimal utilisation of these facilities.

Non-coronary interventions in India

The volume of non-coronary interventions seems to be static. The catheter-based interventions in paediatric cardiology are increasing, but the numbers of percutaneous mitral valvotomies are steadily decreasing because of the decline in rheumatic heart diseases. Despite a high prevalence of diabetes mellitus, the interventions

for peripheral vascular disease have very modest numbers. The programme of non-surgical aortic valve replacement is in its early stages and being performed only in selected centres in small numbers. The main reasons for this are the attitude of the very elderly patients and their families not keen on invasive procedures, non-reimbursement, and lack of structured training programmes for performing these procedures in sick patients.

Transcatheter therapy for aorto-arteritis (Takayasu's disease) was pioneered in India, and a number of techniques to dilate and stent the ischaemia-producing vessels which include the central aorta, arch vessels and branches from descending abdominal aorta, are being performed in several centres in the country.

Documentation of non-coronary interventions, however, has been sketchy. About twenty-five to thirty thousand non-coronary interventions are performed per year in India, with the number remaining fairly steady. Nearly half of these interventions are for valvular heart disease, predominantly for rheumatic mitral stenosis. Catheter-based interventions in congenital heart disease are showing a modest increase, although peripheral arterial interventions are on the decline for reasons difficult to explain.

Perspective

In the absence of any formal training in interventional cardiology the coronary intervention programmes have picked up in a big way, but structural heart disease interventions are lagging behind. Formal training programmes for general cardiology are available, and three-year courses after an MD (medicine or paediatrics) leading to a degree of DM or DNB (cardiology) are a prerequisite before being certified as a cardiologist and getting teaching jobs or jobs in non-government institutions. Most trained cardiologists prefer to go in for interventional cardiology rather than non-invasive cardiology. This is possibly because of the better emoluments offered to invasive cardiologists.

The initial interventional cardiology training experience in India involved the development of *ad hoc* unregulated programmes, mostly located at "high-volume" coronary interventional centres. Practising cardiologists desiring to develop interventional coronary skills would often temporarily leave from their practice and enrol in short-duration observational courses in India and overseas which were often facilitated by industry. In this regard the contribution of Dr Alain Cribier has been noteworthy. A large number of interventional cardiologists were trained in Rouen, France, under his guidance in short-term programmes of two to three months. An Indo-French foundation funded by the industry used to look after these cardiologists in the interventional cardiology teaching programmes.

Interventional cardiology requires multiple skills, including cognitive and procedural competencies, which cannot be gained in the absence of formal training and certification with quality assurance. Formal, defined, and measurable interventional cardiology certification and training is still in its initial stages in India, although the National Board of Examinations offers fellowships in interventional cardiology. SCAI-sponsored courses of a few days are also available from time to time. The constantly evolving nature of this

relatively young subspeciality presents a landscape with many challenges. The robust and sustained evolution of the pharmacological innovations and new medical devices in this field has dramatically changed the practice during the past three decades at a pace and complexity unmatched in most other medical fields. The evaluation and maintenance of procedural competence present an even more challenging issue with very little regulation or control.

Historically, procedural volume has been used as a surrogate for catheterisation laboratory procedural performance and is one of the benchmarks used for rating competence. The concept is that the more procedures an operator performs the better his/her skills become, which will finally result in better clinical outcomes. Formal evaluation processes in this regard are lacking.

In recent years, the practice of interventional cardiology in India has been increasingly scrutinised by patients, tax payers, price-regulatory authorities, and the media. However, there are

no benchmarks, scorecards or publically displayed performance reports to grade physician performance and evaluation. It is hoped that the cardiac societies, the medical councils and the government will take a note of this and come out with guidelines. A comprehensive healthcare programme with insurance is available in some states but not in all. Health is a state subject in India with very few central regulations. It is desirable that in times to come a more structured healthcare system and credible training programmes will be available. This is a necessity which has to be realised.

Interventional cardiology has shown significant growth in India. There are challenges which need to be recognised and adequate measures taken to streamline the processes. The future is very bright and most growth in this area is going to come in our region.

Conflict of interest statement

The authors have no conflicts of interest to declare.