

Percutaneous Transluminal Coronary Angioplasty In Singapore General Hospital in 1995: A Medical Audit

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ABSTRACT

Background : There are few reports which describe the outcomes of unselected groups of patients undergoing percutaneous transluminal coronary angioplasty (PTCA) locally. This study has undertaken to audit the outcome of patients undergoing elective PTCA at Singapore General Hospital.

Methods : Procedural data and acute outcomes were recorded prospectively in all patients undergoing PTCA over a 12 month period. A retrospective casenotes review of all patients were carried by independent observers to determine out-of-lab complications.

Results : Seven hundred and eight-two patients underwent PTCA in 1995. Acute angiographic success rate was 90.9% and early clinical success rate was 89% ie excluding death, coronary bypass surgery and non fatal myocardial infarction. There were only two deaths in the series (0.26%).

Conclusion : The audit confirms the importance of a high volume PTCA cases to achieve excellent results. The data serve as a useful background for future comparison of outcomes. **Keywords:** coronary artery disease, balloon angioplasty

INTRODUCTION

Percutaneous transluminal coronary angioplasty (PTCA) has established itself as one of the treatment modality for coronary artery disease and compares favourably with coronary artery bypass surgery in certain subsets of patients⁽¹⁻⁴⁾. The number of PTCA cases performed in Singapore has increased substantially since its introduction in 1985. One thousand five hundred and thirty-seven such procedures were performed in Singapore in 1995. With increasing cost of new technology and the pressure to introduce newer procedures as soon as possible, there is a real need for proper documentation of both efficacy and effectiveness outcomes. One method is to use outcomes databases to assist in professional quality assurances against agreed standards. The objective of this medical audit is to evaluate the hospital outcome of patients undergoing PTCA including the complication rates during the whole of 1995. With this report, we could target areas where improvements could be made as well as determine the trend and pattern of the usage of this procedure in the future.

METHOD

All clinical data pertinent to patients undergoing PTCA in 1995 as well as procedural data and acute angiographic results were entered prospectively in our PTCA Registry which was set up in 1989. A retrospective casenotes review of all patients was also carried out independently by the Department of Quality Management to determine out-of-lab complications prior to hospital discharge.

Definitions

Primary success is defined as a procedure which achieves an absolute reduction of initial degree of luminal diameter stenosis of at least 20% and a residual diameter stenosis of less than 50%.

Clinical success is defined as a successful reduction of the dilated lesions with no major complications including death, myocardial infarction and coronary artery bypass surgery.

Vessel disease was classified as single, double or triple according to the definitions of the Coronary Artery Surgery Study⁽⁵⁾.

Mortality refers to death occurring during the same hospital admission in which angioplasty was performed.

Acute myocardial infarction (AMI) is defined in this report as the appearance of new Q waves or T wave changes with enzymes twice the upper limit of normal.

Coronary artery bypass surgery (CABG) is defined as CABG done either as an emergency for complications of angioplasty or as CABG during the same hospital admission for a failed but uncomplicated PTCA procedure.

RESULTS

There were 784 patients who underwent PTCA in 1995 at Singapore General Hospital. The mean age was 55.8 ± 9.4 years; 78.3% were males. One hundred and eighteen (15%) of the procedures were repeats. The indications for PTCA were mainly for stable angina (93%), unstable angina (6.5%) and acute myocardial infarction (0.5%). The overwhelming majority of procedures have been on single coronary vessels comprising 83% (654) of the total 784

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Fig 1 - Use of new devices in 1995

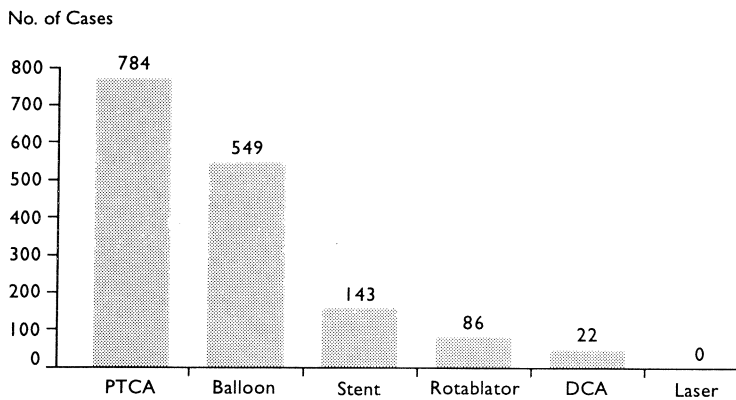


Table I - Non-fatal complications of PCTA in the series

Type of complication	No. of patients	No. of patients/Total PCTA patients (%)
Non-fatal AMI	6	0.77%
CABG	2	0.26%
Groin haematoma	19	2.42%
Acute closure	3	0.38%
Sepsis	2	0.26%
Contrast induced nephropathy	1	0.13%
Cardiac tamponade	1	0.13%
TOTAL	34	4.34%

AMI - acute myocardial infarction

CABG - coronary artery bypass surgery

procedures. Altogether 1,107 lesions were dilated, corresponding to an average of 1.41 lesions attempted per procedure. Of the total attempts, 1,006 were primary successes, ie primary success rate was 90.9%.

New techniques

Several new devices were introduced to Singapore General Hospital. These include newer stents, rotational atherectomy, directional atherectomy and laser angioplasty. In 1995, 143 stents were used, 86 rotational atherectomy and 22 directional atherectomy were performed (Fig 1). There was no procedure which involved the use of laser.

Complications

In 1995, there were 2 deaths during the same admission in which angioplasty was performed. Both occurred within 24 hours of the procedure and one of which followed emergency CABG for complication of PTCA. The mortality rate for the year was 0.26%. The causes of death of the two patients are given below:

Patient 1, an 81-year-old Chinese man with a history of triple vessel disease, heart failure and permanent pacemaker implantaion for complete heart block, was admitted with unstable angina. PTCA with

rotational atherectomy to the left anterior descending artery was performed on 15 April 1995. The patient developed acute closure and hypotension during the procedure and was sent for emergency CABG but he could not be weaned off from cardiopulmonary bypass.

Patient 2, a 68-year-old Chinese man, was admitted on 29 July 1995 with extensive acute anterior myocardial infarction complicated by cardiogenic shock. Acute PTCA was performed on the proximal total occlusion of the left anterior descending artery with satisfactory results and TIMI grade III flow. An intraaortic balloon counter pulsation catheter was inserted after the PTCA. The patient's condition was stable until the next day when he suddenly collapsed with ventricular fibrillation and could not be resuscitated.

Other non-fatal complications are listed in Table I. The proportion of patients defined as early clinical successes was 89%; that is, they had a successful reduction of all lesions, and no major complications predischarge (death, CABG, AMI).

DISCUSSION

The pressure to apply new technology as rapidly as possible has narrowed the gap between tertiary centres and community hospitals so that an orderly process of technology evaluation and transfer cannot be taken for granted. At the same time, the increasing medical costs of new techniques have led to authorities pushing for documentation of the efficacy and safety of these procedures. In addition, individual hospitals, groups and physicians will have to demonstrate that their outcomes results are within the acceptable standards.

Despite the prevalence of coronary angioplasty in both institutional and private hospitals in Singapore, there have been little published data regarding the safety and technical outcome of this procedure in our local patients. In most instances, the success, mortality and other complications rates quoted to the patients when consent is being obtained for the procedure, are based upon overseas published results which may not be appropriate in our local setting.

With improved catheter technology and operator's experience, the spectrum of patients treated with PTCA has widened to include multi-vessel disease and complex lesions morphology. Despite this trend, our primary success rate in 1995 was >90% which is comparable to other "high volumes" centres⁽¹⁻⁴⁾. Among the new devices, stents have been shown to be beneficial in the treatment of acute closure^(6,7) and in recent trials, in the reduction of restenosis after PTCA^(8,9). In 1995, 18% of our patients cohort had coronary stents deployed mainly for dissection and suboptimal results following balloon angioplasty. Notwithstanding the high success rate, certain important complications such as myocardial infarction, unplanned coronary artery surgery and death still remain albeit their low incidence in our series. Our in-hospital death rate of 0.26% compared favourably to 1.0% mortality of NHLBI 1985-1986

PTCA Registry data⁽¹⁰⁾. There is no doubt that operator's experience and a high volume workload have contributed to the success of our interventional programme. A recent study of angioplasty practice in the state of California, USA demonstrated that the average number of angioplasty procedures per operator was only 17 despite the recommendation from the American College of Cardiology that practitioners perform at least 50 procedures per year to maintain proficiency⁽¹¹⁾. Importantly, the mortality rate and the rate of emergency bypass surgery were significantly higher in low-volume operators⁽¹²⁾.

This study was undertaken to audit the hospital outcome of an unselected group of patients who had PTCA in Singapore General Hospital in 1995. The data obtained in this medical audit can serve to evaluate the short-term safety and clinical outcome of this procedure and show what can be accomplished in experienced hands with current technology. Furthermore, we would expect more patients with larger numbers of diseased vessels and poorer left ventricular function to undergo PTCA than before. Other risk factors, including advanced age, diabetes mellitus, bypass surgery and heart failure are also becoming more prevalent. Hence, this study will be a useful gauge for future comparison of outcomes.

In our opinion, current trends make it inevitable that outcome data will be used to document proficiency in interventional cardiovascular medicine. Centres able to demonstrate excellent results with careful data collection will be most likely to generate high volume procedures as medical care system shifts to more managed care.

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