MAXIMIZING ACUTE CORONARY SYNDROME OUTCOMES IN THE FACE OF CHALLENGING RESOURCES

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Unpublished data from in Lady Reading Hospital, a tertiary care hospital in Peshawar, documented total admissions of 6510 in 2013 to Cardiology department which consisted of CAD 3766 (57.85%) presenting as STEMI 1733 (46.02%), NSTEMI 483 (12.82%) and USA 750 (19.9%). Others presented as heart failure or arrhythmias due to RHD, cardiomyopathy or CHD. Mean age of the patients was 56.7 ± 11.9 years. Gender distribution was males 63.7% and females 36.3%. Mean BMI (kg/m^2) was 24.2 ± 3.5, and in males 22.8 ± 4.1 and in females 26.1 ± 6.5. Mean hospital stay was 4.7 ± 1.9 days, for STEMI 4.9 ± 2.1, NSTEMI: 3.8 ± 0.9 and UA: 3.7 ± 1.1. Thrombolysis with Streptokinase was administered in STEMI to 80.8% patients and thrombolysis was successful in 73.1% patients. Mean time from onset of symptom till streptokinase administration was 5.2 ± 6.8 hours and mean door-needle time was 59 ± 23 minutes. Patients who reported late for thrombolysis or had contraindications were 12.2%. Patients, who were referred to Catheterization Laboratory for angiography were 13.3% and of them 25.9% had SVD, 22.2% DVD, 31.5% TVD and 20.4% LM Stem. Revascularization strategy was PCI in 66.6%, CABG in 29.6% and medical follow up in 3.7%. DES was implanted in 69.4% and BMS in 30.5% patients.

In a study on 1000 patients presenting with Acute Myocardial Infarction conducted at a major regional cardiology centre mean age was 56.6 years (SD $\pm$ 11.48), 88.5% were males and 11.5% females. Mean duration of symptoms was 4 hours and 39 min with a range of 10 min to 72 hour. Of them 98 % received nitrates and 57.7% Aspirin and 51.6% received streptokinase. Mean hospital stay was 5.7 ± 4.7 days with a range of 0 to 11.9 days. Overall in-hospital mortality was 13.2%. Pump Failure was the leading cause of death, accounting for 42% deaths. Cardiac arrest was cause of death in 34% cases. Refractory arrhythmias caused death in 8% and rest died due to pump failure. Mean Cholesterol (mg/dl) was 182.85 ± 44.84 and Triglycerides (mg/dl) 153.99 ± 104.99.[1]

In a study at AKUH Karachi, from January 2001 to December 2005, 277 subjects were enrolled for Primary Percutaneous Coronary Intervention (PPCI) with

median follow up of 546 days. A total of 2500 PCIs were done in this time period which translates into 11.08% as Primary Angioplasty. Mean age was just under 55 years. Approximately one-third were diabetic and 15% patients had Cardiogenic shock or required intubation. Mean LVEF was 45%. Median time from- onset of symptoms to presentation was 160 minutes, and the median door-to-laboratory time was 90 minutes. Of them 23 died in the hospital (8.3%), and another 11 subjects died during follow up. Major bleeding was documented in 4.3% of patients.[2]

A study in China enrolled 2973 patients admitted to 51 hospitals in 18 provinces of China from September 2004 to May 2005. Of them STEMI were 43%, non-STEMI 11% and unstable angina 46%. There was little evidence that clinical risk stratification was used to determine the intensity of investigation and management. Mortality during hospitalization was 5% but reported in-hospital re-infarction rates were 8% and heart failure in 16% patients. These were substantially higher at non-tertiary centres. In patients with STEMI, primary reperfusion therapy (thrombolysis or PCI within 12 hours of symptom was administered to 36% patients admitted to hospitals with Cardiac Cath Lab and 31% admitted to those without such facilities. Proportion of patients with STEMI undergoing PCI within 12 hours of symptom was 16.3% and 6.6% in tertiary and non-tertiary care hospitals respectively. Median door-to-needle time was 55 min for level 2 hospitals and 61 min (26-120) for level 3 hospitals. Median door-to-balloon time was 51 min (30-180) in level 2 hospitals and 90 min (60-175) in level 3 hospitals.[3]

In a study on 200 patients presenting with ACS, TIMI score was compared with coronary angiographic results. Mean age was 58.53 ± 10.64 years. Of them 142 (71%) patients with TIMI score<4 (low and intermediate TIMI risk score) and 58 (29%) patients with TIMI score>4 (high TIMI risk score). TIMI score>4 more likely to have significant three vessels CAD (62 %) versus those with TIMI risk score<4 (46.2 %), ($p< 0.04$). Patients with TIMI score>4 should be referred for early invasive coronary evaluation to derive clinical benefit.[4]

Comparing Asian versus Caucasian patients some interesting observations were made. Asian patients were younger than Caucasian patients (61 vs. 69 years, $p=0.001$) and more had diabetes (43% vs. 17%, $p=0.001$). Proportionally, more Asian patients had angina (51% vs. 37%, $p=0.001$), but more Caucasian patients had myocardial infarction (63% vs. 49%, $p=0.001$) and non-ST elevation infarcts (40% vs. 29%, $p=0.001$). Men reported smaller areas of discomfort than women. Asian patients more frequently reported discomfort over the rear of their upper bodies compared to Caucasian patients (46% vs. 25%, $p=0.001$) and radiation of discomfort to their arms and necks. A higher percentage of Asian than Caucasian patients demonstrated a "classical" location of symptoms (90% vs. 82%, $p=0.001$). Patients with diabetes were more likely to feel no discomfort. A higher percentage of Caucasian than Asian patients presented with "silent" events (13% vs. 6%, $p=0.001$), with age being a major determinant. Asian patients were younger, more likely to be diabetic and tended to report a higher intensity of pain and over a greater area of their body, and more frequent discomfort over the rear of their upper thorax than Caucasian patients.[5]

There is compelling data supporting the supremacy of PCI in the setting of ACS. Most developing countries, like ours, do not have a ready access to Cardiac Catheterization Laboratories available twenty fours seven days a week and referral for PPCI hovers around 15% in hospital with onsite cardiac catheterization laboratory. There are problems relating to availability of well-trained staffed and competent interventional cardiologists. Streptokinase has been shown to preserve left ventricular function and improve clinical outcomes. The use of Streptokinase has to be maximized even in remote settings by making the drug available free of cost and training the staff to anticipate and handle the complications. Close monitoring of relevant parameters like glycemic and blood pressure control can improve outcomes. In such circumstances drugs which have proven to be of benefit must be used enthusiastically inclusive of Aspirin, Clopidogrel, beta Blockers, ACE inhibitors, ARBs, and Statins.[6,7]

Today, the goal is to treat every patient with the best reperfusion strategy available, given the limitations in resources and the geographic location of some centers, and to maximize the possibility of sustained patency of the infarct-related artery by implanting a stent, even if it takes several hours and transfer to another hospital to perform PCI. The pharmaco-invasive strategy of rapid administration of fibrinolytic therapy followed by PCI within 24 hours would be practical in most hospitals without PCI capability where treatment delays prohibit performance of primary PCI within 90 minutes of first medical contact. Such a strategy can work well in our resource restrained environments where patients can be selected for further interventions following the current guidelines.[8]

It has been estimated that from 2010 to 2025, the projected increase in crude yearly mortality per 100 000 population due to cardiovascular diseases will be from 125.5 to 144.4, cancers 55.3 to 72.3, chronic respiratory diseases 42.4 to 47.3, and road traffic accidents 10.7 to 14.5. Accompanied by Pakistan's growing population, these rates correspond to the total number of yearly deaths due to cardiovascular diseases rising from 231 400 to 307 200, cancers 102 100 to 153 900, chronic respiratory diseases 78 200 to 100 700, and road traffic accidents 19 700 to 30 900. These projections indicate that in Pakistan from 2010 to 2025, the cumulative number of deaths from cardiovascular diseases, cancers, and chronic respiratory diseases in people aged 30-69 years is predicted to be 3.87 million.[9,10]

In contrast to this huge burden of communicable and non-communicable diseases, the public sector spends 0.9% of Pakistan's GDP on health-low by any standard. All health indicators are poor, with higher Infant mortality and maternal mortality rates than the goals set by Millennium development goals and high rates of NCDs in young adults leading to loss of national productivity. Public investments by the federation and provinces should increase to at least 5% of GDP by 2025. Even in the existing constrained setting, spending on health could be increased if resources are managed better with promotion of austerity. Health systems cannot manage the rising burden of NCDs as the total per person expenditure on health from public and private sectors is less than $18 per year. There is no separate budget for preventive services or programs for NCDs. The public system plays a huge part in rural areas but have a shortage of qualified staff. None of health cadres is trained for NCDs. Family physicians offer primary care to 75% urban population. Serious deficiencies exist in knowledge, management, and prevention of hypertension and CVDs.[11-13]

How can we generate resources to offer evidence based treatment to our patients in the setting of acute coronary syndrome. This can be done by generating more revenue by earmarking of a service tax for welfare and health. Establishment of compulsory health insurance schemes for formally employed individuals. Improvements in financial access to health equity funds for individuals who are poor and cannot afford. Innovations in the existing social protection programs to risk protect the poorest individuals from health shocks.[11,14]

Evidence based treatment for acute coronary syndrome with offering in-time reperfusion treatment cannot be improved in isolation. The whole emergency setup has to improve at root base levels with in-time recognition, assessment, referral and transfer and definitive treatment. There has to be improvement in our medical education and needs some good local research.[15] Health being a provincial subject the onus falls on the provincial health department to start a program for free comprehensive emergency services. Provincial policies are needed for strategies to achieve universal health access. Improved resourcing and management of public service delivery facilities is the need of the day. Introduction of programs for population planning, NCDs and integration of communicable disease control into primary health care is desirable. Incorporation of population-wide blood pressure screening in the work plan for LHWs should be recommended. Targeted links with the private sector for specific objectives, such as emergency transport systems. Capacity building is required to harness private sector outreach.[11,14]

To conclude, in our circumstances emphasis should be on efficient and cost effective primary prevention strategy to reduce or avoid patients presenting as acute coronary syndrome. Early, widespread and efficient use of Streptokinase has to be made mandatory. Use of all evidence based therapeutic regimen has to be encouraged to optimize the outcomes. Currently very few centres, if any, can afford to offer primary PCI to all patients but efforts need to be made in this direction, initially in selected cases and later for all comers. Selection of patients for interventions based on indications and importantly provision of free services for emergency interventional services is direly needed with allocation of special funds.

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