MECHANICAL ASSIST IN THE TREATMENT OF IMPENDING OR ESTABLISHED MYOCARDIAL INFARCTION AND CARDIOGENIC SHOCK

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In recent years many methods of circulatory assistance, ranging from the mechanical heart, to transplantation, have been proposed for the acute cardiac problems. Of these, intra-aortic balloon assist and pump oxygenator support are the two methods which have best survived the test of time.

(A) AORTIC BALLOON PUMPING (IABP)

Intra-aortic phase-shift balloon pumping is a bedside technique of mechanical circulatory assistance that is becoming increasingly relevant to the clinician. The procedure is applied easily and rapidly in patients with early, acute ischaemia or shock secondary to acute myocardial infarction. In general, adjunctive clinical management is directed toward improving cardiac function and careful, sequential correction of systemic abnormalities. The cumulative experience of a number of groups indicates that the risk of complications is slight.

Several groups of investigators have reported (1,3,4,5) evidence that phase-shift pumping improves physiologically important haemodynamic and other variables, both in patients with severely impaired left ventricular function and in various experimental models. In particular, evidence has been obtained that myocardial oxygenation and cardiac output are enhanced, while oxygen needs are reduced. Studies in our laboratory have indicated that a left ventricular afterload phase angle of approximately 180° is one of the necessary conditions for maximal effectiveness.

The principles of aortic balloon implementation are well described elsewhere. (2)
The following groups of patients are most amenable to aortic coronary balloon pumping, to be followed by coronary angiography and surgery, when feasible:

A. **Unstable Angina Synoromes**

Def: 1) New angina  
2) Angina at rest  
3) Prolonged chest pain

Bal.Crit: 1) Pain after 12 hrs of bed rest  
2) Transient EKG changes. Normal enzymes  
3) Failure of medical Rx

B. **Acute Inf. - Recurrent Pain**

Bal.Crit: 1) Continuous isch. pain over 12 hrs  
2) Completed inf.,

C. **Acute Inf. Haemodynamically Unstable, No Shock**

Def: 1) S₃ gallop  
2) Sinus tach. or A.F.  
3) PCW above 18 mm.Hg.  
4) C.I. < 2.5 but > 1.9  
5) Syst.BP > 100 mm.Hg.

Bal.Crit: 1) Fresh ant. MI.  
2) Any combination of old and new inf.

D. **Acute Inf. with Mech.Defect**

VSD  
MR

Bal.Crit: All patients

E. **Acute Inf. - Cardio. Shock**

Def: 1) Syst. BP < 100 mm.Hg.  
2) PCW > 18 mm.Hg.  
3) C.I. below 1.9  
4) Oliguria, anuria  
5) Change in mental state

Bal.Crit: Only for younger patients seen early - if coronary anatomy optimal

**RESULTS:**

Results in the unstable angina (Group A) are most encouraging with an overall mortality rate of less than 5% reported in most centres.(4,6,9)

By contrast, in Groups B to D the risks are higher with mortality rates up to 25%.