

POSTINFARCTION ANEURYSM: FACTORS AFFECTING SURGICAL REPARATION

A Leone

ABSTRACT

24 patients, who developed postinfarction aneurysm (PA), were studied by means of echocardiography, radionuclide imaging, Holter monitoring, cardiac catheterization and angiography in an attempt to establish the main factors affecting surgical reparation.

All patients (100%) showed severe and diffuse coronary pathology, cardiac failure, life-threatening arrhythmias, ejection fraction (e.f.) between 16% and 44% (mean: 31.5%). 8 patients (33.3%) who displayed an e.f. between 38% and 44% (mean: 41.8%), underwent successfully aneurysmectomy accompanied by coronary artery bypass graft surgery in 6 cases.

Cardiac performance as assessed by e.f. seems to be the main factor, influencing surgical reparation.

KEY WORDS: postinfarction aneurysm, surgical reparation, ejection fraction.

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INTRODUCTION

Left ventricular aneurysm is an important complication of acute myocardial infarction (AMI) and its incidence varies widely between 2% and 15% (1).

Many investigations (2-5) suggest that a large number of patients with postinfarction aneurysm (PA) have extensive, diffuse multivessel coronary artery disease, angina pectoris, ventricular arrhythmias, heart failure and embolism. These complications are often refractory to medical treatment (6).

Long-term symptomatic improvement has been reported if surgical reparation was performed in patients with PA (1, 7-9) despite an appreciable operative risk. It ranged from 3% to 50% (10). So surgical approach to patients with PA should be carefully considered.

The aim of this study was to assess the main factors affecting favourable surgical reparation of PA.

METHODS

The patient population comprised 24 subjects, who developed PA. There was 23 men (95.83%) and 1 woman (4.17%), aged from 38 to 57 years (mean: 49). All the patients were studied by means of two dimensional echocardiography, radionuclide imaging, Holter monitoring, cardiac catheterization and angiography.

The following parameters were analyzed:

- Location of the infarction;
- Coronary anatomy;
- Symptoms of congestive heart failure. Congestive heart failure was quantified as classes 1-4 according

to the criteria of the New York Heart Association (NYHA) (11);

- Frequency of angina pectoris;
- Frequency of ventricular arrhythmias. Ventricular arrhythmias were defined as the occurrence, at least one month after the infarction, of ventricular fibrillation, ventricular tachycardia, life-threatening premature ventricular beats;
- Embolic events. They were considered if clinical signs of peripheral vascular occlusion were documented;
- The value of ejection fraction (e.f.).

At the end, the surgeon settled the operability for the patients included in this study.

RESULTS

The features we met in the population of this study are reported in table 1.

All the patients had a transmural infarction located anteriorly in 20 cases (83.30%) and anteriorly and inferiorly in 4 cases (16.70%). 14 patients (58.30%) showed two vessel coronary artery disease, whereas 10 (41.70%) were affected by three vessel coronary artery disease. Congestive heart failure appeared in all cases (100%). 14 patients (58.30%), 8 showing three vessel coronary artery disease and 6 with two vessel coronary artery disease at the coronary angiography, satisfied the criteria of the NYHA class 2; the rest were in class 3. Angina pectoris affected 6 patients (25%) showing three vessel coronary artery disease. All the patients had ventricular arrhythmias, diagnosed by Holter monitoring as life-threatening arrhythmias (fig. 1, 2, 3). The e.f. ranged from 16% to 44% (mean: 31.5%). This parameter allowed to identify a group of 8 patients (33.30%) who showed values between 38% and 44%. 6 out of these 8 patients, who were in NYHA class 2, displayed two vessel coronary artery disease, whereas the 2 others documented 3 vessel coronary artery disease as well as severe congestive heart failure. This group underwent successfully aneurysmectomy accompanied by multiple bypass in 6 cases. On the contrary, one patient with an e.f. of 34% deceased from cardiogenic shock three days after surgical reparation.

Division of Medicine,
City Hospital,
Pontremoli (MS),
Italy.

Correspondence to: Dr. Leone, Chief Via
Provinciale 27, Colombiera 19030,
Castelnuovo Magra (SP), Italy

Table 1
FEATURES OF THE PATIENTS AFFECTED BY PA

Analyzed Parameters	No of pts (24)	Two vessel coronary disease	Three vessel coronary disease
NYHA 2nd Class	14 (58.3%)	6 (43%)	8 (57%)
NYHA 3rd Class	10 (41.7%)	8 (80%)	2 (20%)
Angina pectoris	6 (25.0%)	0	6 (100%)
life-threatening ventricular arrhythmias	24 (100%)	14 (58.3%)	10 (41.7%)
Infarct location anterior	20 (83.3%)	14 (70%)	6 (30%)
anterior + inferior	4 (16.7%)	0	4 (100%)
Ejection fraction (16%-44%, mean: 31.5%)			
> 35%	8 (33.3%)*	6 (75%)	2 (25%)
< 35%	16 (66.7%) (1**)	8 (50%)	8 (50%)
Embolic events	0	0	0

*) ½ Successfully surgical reparation
**) = Unsuccessfully surgical reparation

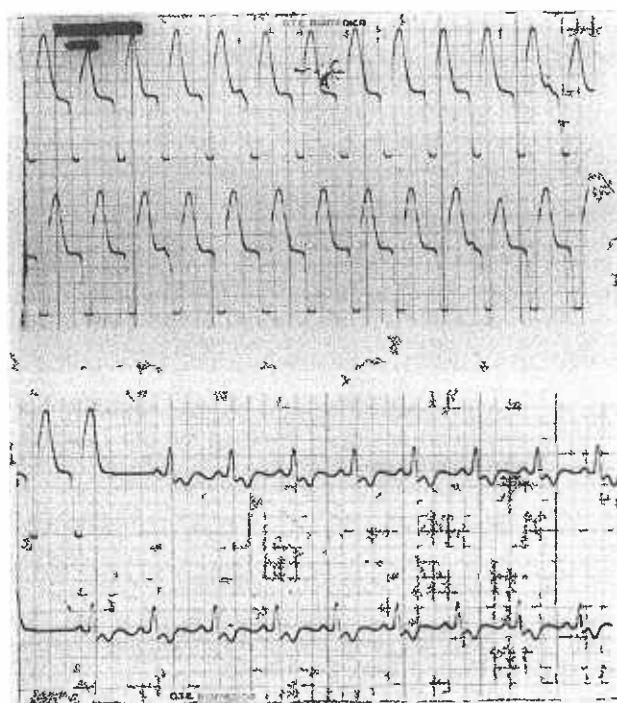


Fig. 2: Recorded electrocardiogram (continuous monitoring) of a patient with PA one month after the infarction showing ventricular tachycardia.

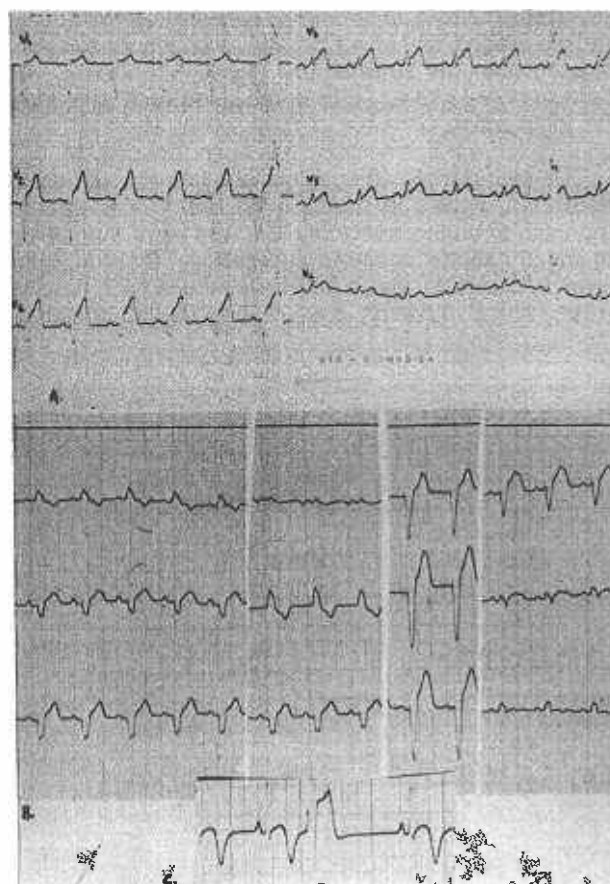


Fig. 1: Recorded electrocardiogram and Holter monitoring. One can see an anterior infarction with ST \uparrow (A), which was evident one month after the infarction (B). A premature ventricular beat during Holter monitoring (C).

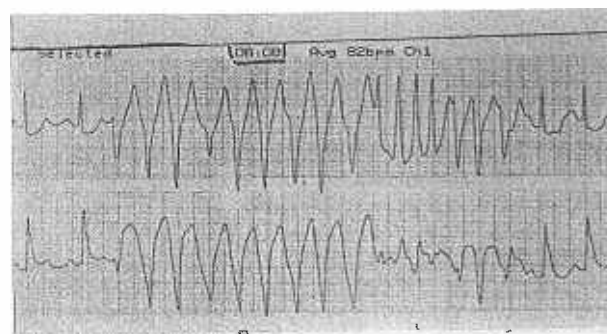


Fig. 3: Torsades de pointes (Holter monitoring).

DISCUSSION

At least five factors may affect the prognosis of the patients with PA: severe heart failure, recurrent thromboembolism, refractory angina due to diffuse coronary alterations, location and extension of the infarction, occurrence of life-threatening ventricular arrhythmias (5, 6, 12, 13).

The population of our study was affected by these complications with a variable incidence. Cardiac failure and ventricular arrhythmias have been seen in all the patients; angina pectoris affected only 6 patients; no embolic events have been observed. The location and extension of infarction were similar to that reported by others (6, 12, 13).

The correct therapeutic approach of aneurysmectomy accompanied by revascularization may be performed on a limited number of cases (5), being congestive heart failure the primary indication for that. In our study

aneurysmectomy was performed successfully in 33.30% and the patients had an e.f. > 35%, even though the size of aneurysm was considerable (fig. 4, 5, 6). Only one patient (4.17%) with e.f. < 35% deceased three days after the intervention because of cardiogenic shock. Pump failure after aneurysmectomy has been reported (14).

Cardiac performance, effective parameter of which results e.f., seems to be the main factor for a current approach to aneurysmectomy. E.f. was more than 35% for the 8 patients operated successfully. On the other hand, PA subjects with a minimally reduced e.f. have a better clinical outcome even if they do not undergo aneurysmectomy (15).

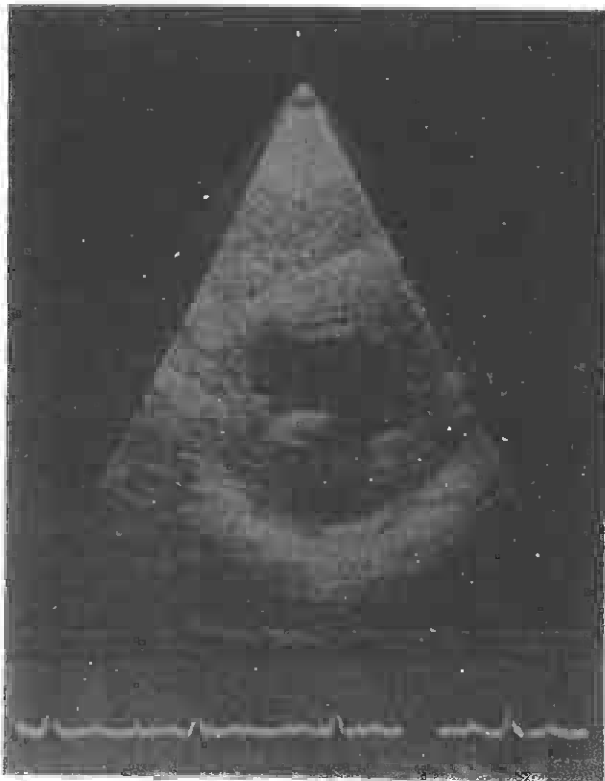


Fig. 5: Two-dimensional echocardiogram showing a large apical aneurysm.

CONCLUSION

From our data one can identify among the patients with PA a medical group, characterized by severe cardiac failure and e.f. considerably reduced as well as a surgical group with e.f. moderately diminished. The value of e.f. seems to be useful to categorizing patients into either group.

We disagree with others (6, 10), who consider potential candidates for aneurysmectomy only those patients refractory to medical treatment. This might perhaps explain the failure attributed by some reports (16, 17) to surgical reparation of patients with PA.

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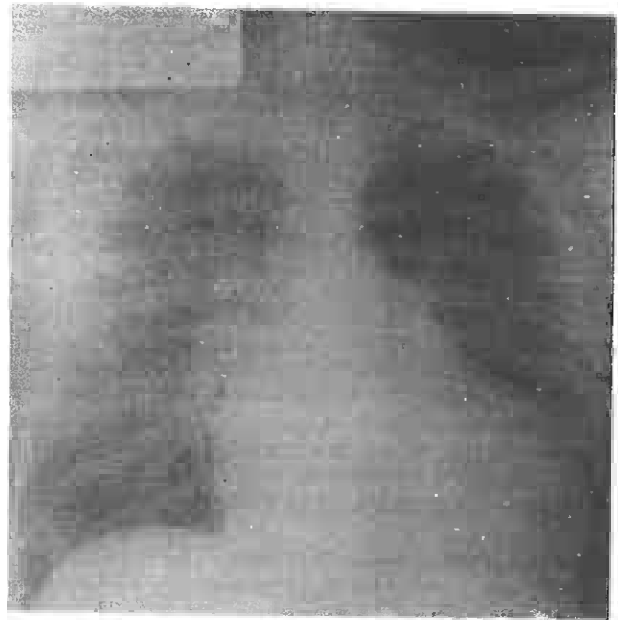


Fig. 4: Chest film of a patient with PA. Heart markedly enlarged with dominance of the third arch of the left ventricle, due to a large aneurysm.

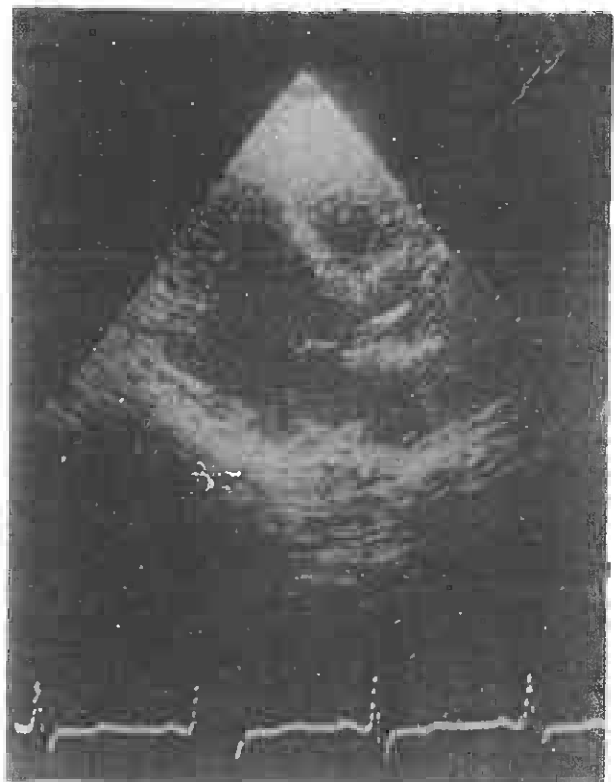


Fig. 6: Two-dimensional echocardiogram showing left ventricular aneurysm involving the distal septum and anterior wall.

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