

Management of Penetrating Wounds of the Heart

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Abstract :- Objective: The objective of the work was to define the particularities of surgical management of patients with heart wounds.

Patients and method: This was a retrospective study of patients suffering from heart wounds and treated in a cardiovascular surgery department between 2014 and 2022. The data studied were the site of the lesions, the treatment times, load, preoperative clinical and paraclinical data, surgical technique and mortality.

Results: Twelve patients (11 men/1 woman) with a mean age of 32 ± 14.7 years. The average surgical treatment time was 52.5 ± 31 min. Two patients underwent median sternotomy, one via subxiphoid approach and nine via thoracotomy. Right ventricular injury was observed in 10 patients. Treatment was surgical in all patients.

Conclusion: This is a serious emergency. The treatment is surgical, the approach depends on the site of the chest wound. The prognosis varies depending on the time it takes to receive treatment.

Keywords:- Heart Wound, Sternotomy, Thoracotomy, Surgery.

I. INTRODUCTION

Heart injuries are a surgical emergency, the prognosis of which depends on the initial treatment, the mechanism of the injury, and the hemodynamic state of the patient when help arrives (1). Despite progress made in pre-hospital care and diagnosis, mortality remains high. They generally result from a gunshot or stab wound; more rarely, rib fractures can be responsible for pericardial lesions. When the diagnosis is made, treatment is based on emergency surgery.

II. PATIENTS AND METHODS

This is a retrospective study extended over a period of 8 years, between January 2014 and December 2022, about 12 patients presenting with a heart wound, and having been treated within the cardiovascular surgery department of the Gafsa regional hospital.

All data used in our work were collected from the patient files of the cardiovascular surgery department of the Gafsa regional hospital.

The collection of data in medical files was done in ascending chronological order from January 2014 to December 2022, using operating records.

For the statistical study, we reported all the data on an Excel table and we used the SPSS 23 software.

The qualitative variables of our study were expressed as percentages and numbers, while the quantitative variables were expressed as means \pm standard deviations.

III. RESULTS

This was a series of 12 patients suffering from a stab wound to the heart (11 men and 1 woman), average age 32 ± 14.7 years.

The treatment time between the trauma and arrival in the cardiovascular surgery unit was 52.5 ± 31 min. 11 patients presented with collapse before arriving at cardiac surgery defined as a systolic blood pressure less than 90 mm Hg and a heart rate greater than 120/min. Six patients had a chest CT scan which revealed pericardial effusion each time.

Six patients were taken to the operating room straight away. The approach was a subxiphoid Marfan approach once, a median sternotomy twice and an anterolateral thoracotomy nine times.

LV injury occurred in two patients (16.7%) and RV injury in ten patients (83.3%). There were no wounds in the left atrium, right atrium, coronary arteries or great vessels. Finally, four times we found a pulmonary parenchymal wound associated with an intrapericardial lesion.

All lesions were treated with a beating heart by simple myorraphy using separate points with 5/0 prolene or supported on a dacron patch (one case).

The postoperative course was simple for all patients, we reported no deaths and the average length of stay in the cardiovascular surgery unit was 11.5 ± 3 days.

IV. DISCUSSION

Ten percent of chest trauma is responsible for heart damage. The etiology is most often a firearm or stab wound; closed trauma and iatrogenic wounds are rarer (2).

There is a contrast between pre-hospital mortality and that of patients arriving living in a hospital structure. Thus, in an autopsy series of heart wounds, 87% of deaths occurred at the scene of the trauma, most often related to hemorrhagic shock (3). On the other hand, in retrospective series of operated patients, mortality can be less than 20%, particularly for stab wounds. The prognostic factors are: a short time to surgical treatment; the young age of the patient; the absence of associated lesion or comorbidity; and the existence of a preoperative tamponade chart (4). The series we present has epidemiological characteristics

comparable to those in the literature, with a majority of young men presenting stab wounds to the right cavities.

In our series, 6 out of 12 patients had a chest CT scan upon arrival and no patient had a cardiac ultrasound. Given its availability in our department, performing a chest CT scan has never delayed surgical treatment. Cardiac ultrasound, which can be repeated on demand, is the test of choice in the management of cardiac trauma. For the diagnosis of pericardial effusion, its sensitivity is 96%, its specificity and its positive predictive value are 100% (5). In case of doubt about a penetrating lesion of the cardiac area, an intermediate approach between monitoring and surgical exploration by sternotomy or thoracotomy may be thoracoscopy. This minimally invasive method has the advantage of being able to diagnose a heart wound, to be able to assess the associated intra-thoracic lesions on the side of the lesion and finally to determine the best approach if a surgical procedure is required. 'imposes (6). Other authors have been able to propose surgical pericardial drainage using the Marfan route in stable patients who do not present signs of active hemorrhage at the time of treatment (7).

However, in the majority of cases the notion of trauma to the cardiac area and the existence of pericardial effusion justify systematic surgical exploration (8,9).

The surgical technique for repairing heart wounds is not very specific. This is a myoraphy with separate points, supported or not on synthetic or pericardial strips, the imperative of which is to ensure perfect hemostasis of the damaged cardiac cavities. The morbidity linked to this procedure is low and we have never had any immediate complications. In the long term, we find in the literature a case of coronary stenosis with angina and a case of pseudoaneurysm of the left ventricle (10,11).

V. CONCLUSION

Heart injuries have a high pre-hospital mortality but patients arriving alive at the hospital a priori present simple cardiac lesions which can be treated by cardiomyoraphy with very good results. The use of extracorporeal circulation remains exceptional. The most determining prognostic factor is the delay in surgical treatment.

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Fig 1: Right ventricular wound operated by median sternotomy