Original Research Article
IS THERE AN ELECTRO-ANGIOGRAPHIC CORRELATION IN VD INFARCTION?

Introduction: Coronary angiography is the examination of choice in the evaluation of coronary anatomy during acute myocardial infarction, particularly of the right ventricle (RV), whose diagnosis remains difficult. The electrocardiogram reflects the pathophysiology of myocardial ischemia, thus allowing prediction of the culprit lesion.

Objective: To investigate the correlation between electrical and coronary data and to judge the reproducibility of the electrocardiogram in identifying the culprit lesion in DV infarction.

Materials and methods : Retrospective study of patients hospitalized in the Cardiology Department of the Mohammed VI University Hospital in Marrakech over a period of 24 months for MDI extended to the VD.

Results: During the study period, 120 patients were hospitalized for MI with DV extension.

Inferior MI represented 70% of all cases of infarction extended to the VD. It is represented electrically by isolated ST-segment elevation in V3R found in 76%, as well as in association with an elevation in V4R in 45% of cases.

Conduction disorders were noted in 38% of cases, presented essentially by first degree atrioventricular block, without any electrical specificity.

Coronary angiography was performed in 91% of patients, half of whom underwent coronary angioplasty. A bi-truncular involvement (DC + VIA) was found in 40% of cases, the middle DC is the culprit lesion in almost half of the cases of VD infarction.

The presence of an ST elevation in the isolated V3R shunt is a specific criterion of right middle coronary involvement, found in 48% of patients.

Conclusion: The ECG remains an essential tool in the early prediction of the artery responsible for the infarction. Because of its complementary nature, the combination of ECG and coronary angiography is essential for a better evaluation of acute myocardial infarction..

Keywords: VD infarction, ST-segment mismatch, right shunts, right coronary.

INTRODUCTION:

Coronary angiography is the examination of choice in the evaluation of coronary anatomy during acute myocardial infarction, particularly of the right ventricle (RV), whose diagnosis remains difficult. The electrocardiogram reflects the pathophysiology of myocardial ischemia, thus allowing prediction of the culprit lesion (1).

The objective of this work is to study the correlation between electrical and coronary data, as well as to judge the reproducibility of the electrocardiogram in identifying the culprit lesion in DV infarction.

MATERIALS AND METHODS:

This is a retrospective and descriptive mono-centric study spread over a period of 24 months, covering patients hospitalized in the Department of Cardiology and Vascular Diseases at the Mohammed VI Hospital Center in Marrakech between September 2019 and October 2021, for myocardial infarction extended to the right ventricle.

Records of patients hospitalized with the diagnosis of DV-extended MI were identified from the department's registries and archives.

RESULTS:

During the study period, 120 patients were hospitalized for MI with DV extension. Inferior MI represented 70% of all cases of infarction extended to the VD. It is represented electrically by isolated ST-segment elevation in V3R found in 76%, as well as in association with an elevation in V4R in 45% of cases (Figure 1).

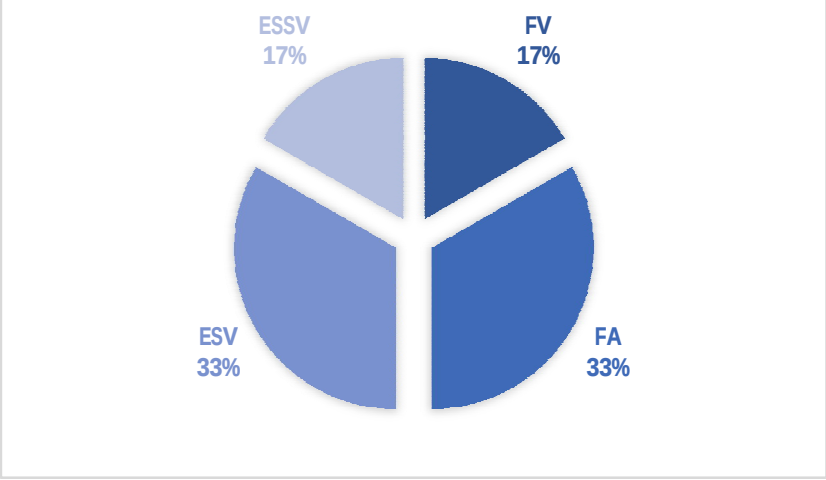

Figure 1: Rhythm disorders noted in our series.

Conduction disorders were noted in 38% of cases, presented essentially by first degree atrioventricular block, without electrical specificity noted. As for rhythm disorders found in 10% of cases, presented essentially by atrial fibrillation and ventricular extrasystole (Figure 2).

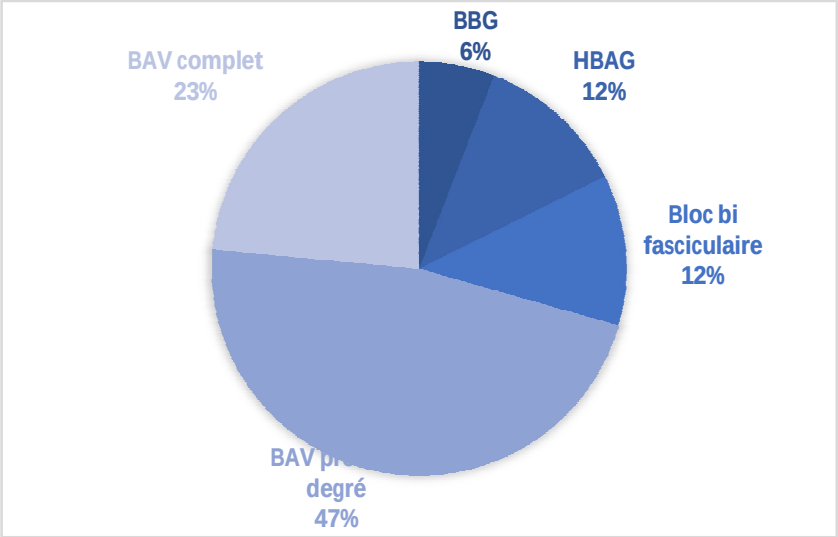

Figure 2: Conduction disorders noted in our series.

Coronary angiography was performed in 91% of patients, half of whom underwent coronary angioplasty. A bi-truncular involvement (DC + VIA) was found in 40% of the cases (Figure 3). The middle DC is the culprit lesion in almost half of the cases of VD infarction.

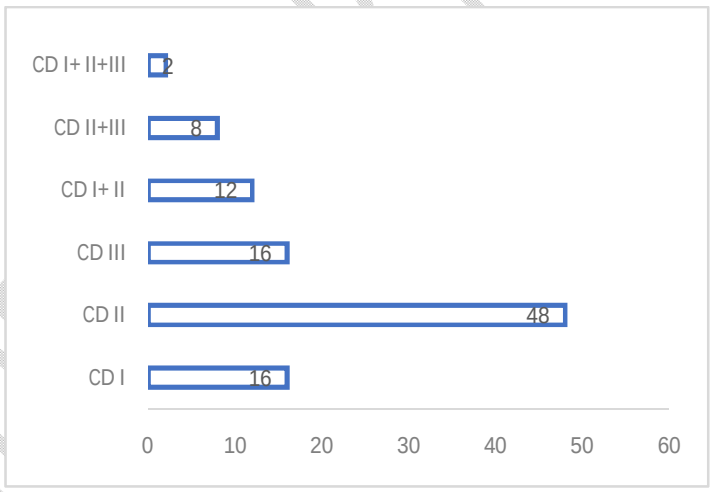

Figure 3: The distribution of the segments of the affected right coronary.

The presence of ST elevation in the isolated V3R lead is a specific criterion of right middle coronary involvement, found in 48% of patients (Figure 4).

Figure 4: Coronary angiography abnormalities found during V3R supershift.

DISCUSSION :

Right ventricular free wall infarction is usually related to occlusion of the right coronary artery and more rarely a branch of the anterior interventricular artery.
It occurs in about one third of inferior infarcts or more rarely in basal, lateral, or even anterior infarcts, but rarely occurs in isolation (2).
Right ventricular infarction is often silent and only 25% of patients develop hemodynamic manifestations suggestive of the diagnosis (pallor, drop in blood pressure, low flow).
Suspicion of RV infarction contraindicates the use of trinitrin.

The diagnosis should be evoked in the acute phase on a 12-lead tracing in front of any acute or old inferior infarction associated with ST elevation in V1(V2-3) (2) or in RV ≥ 1 mm (leads close to the VD) (3). The existence of this overshoot is a poor prognostic factor. Recording of abnormal right ventricular electrical potentials in the right precordial leads depends on the degree of hourly rotation of the heart in the horizontal plane and on the body geometry. Exceptionally, ST elevation in V1 (V2) may be the only alarm sign (dome-like appearance, without Q-wave appearance) (4).For all these reasons, a DV infarction should be suspected in case of inferior infarction, on clinical and/or ECG data (ST+ in V3R or V4R or V1) and the diagnosis confirmed by echocardiography. This diagnosis is useful to guide therapy (vascular filling).

Angiographically, it is usually associated with an occlusion of a right coronary artery dominated, the right coronary is the culprit artery in 94% , (of which 50% of lesions are located on CD I)(1).

Distinction between DC or VIA occlusion is possible by recording right precordial leads (V3R, V4R), with ST elevation in V3R or V4R being the usual signature of proximal DC occlusion. Per-critical V4R recording in patients with acute inferior wall infarction also distinguishes patients with proximal or distal DC occlusion with 90% sensitivity and 91% specificity (5). For authentication of right ventricular infarction, and to guide filling in case of arterial hypotension, imaging is best relied upon (4).

DV infarction is a cause of arterial hypotension related to the sudden decrease in right ventricular systolic ejection (5), immediate mortality is high in the absence of adequate treatment (filling, deobstruction...).

After the 10th day, the prognosis depends only on the left ventricular function.

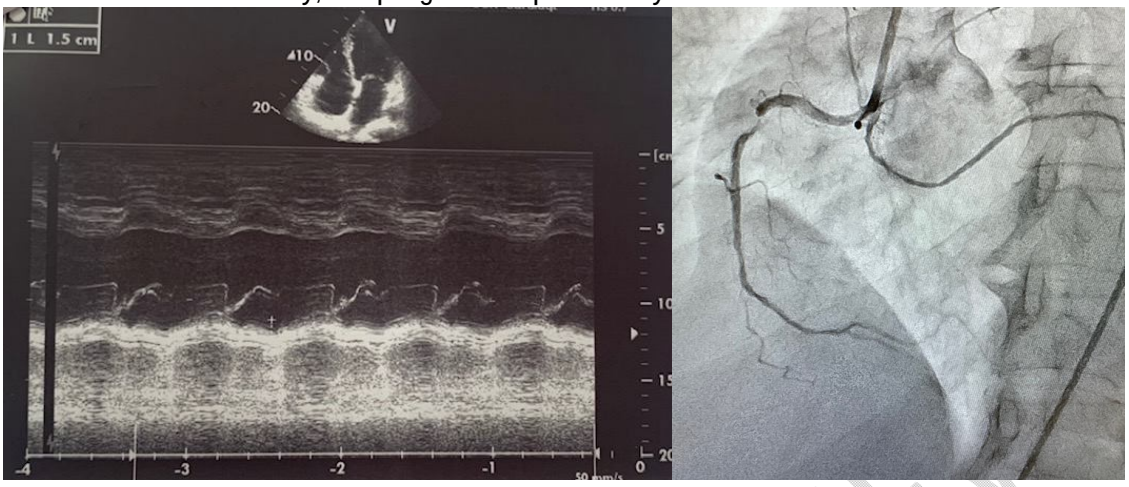

Figure 5 : DV dysfunction, 15 mm TAPS (A) in relation to a middle CD lesion (B) in a 65 year old patient admitted for lower ST+ ACS.

CONCLUSION :

The ECG remains an essential tool in the early prediction of the artery responsible for the infarction. Because of its complementarity, the combination of ECG and coronary angiography is essential for a better evaluation of acute myocardial infarction. Resuscitation by vascular filling to maintain an adequate preload of the VD remains the first-line treatment. Revascularization, preferably by primary percutaneous interventional approach, is the cornerstone in the management of DV MI.

REFERENCE :

1. Carroll R, Sharma N, Butt A, Hussain KMA. Unusual electrocardiographic presentation of an isolated right ventricular myocardial infarction secondary to thrombotic occlusion of a non-dominant right coronary artery--a case report and brief review of literature. Angiology. janv 2003;54(1):119-24.
2. Chen YL, Hang CL, Fang HY, Tsai TH, Sun CK, Chen CJ, et al. Comparison of Prognostic Outcome Between Left Circumflex Artery-Related and Right Coronary Artery-Related Acute Inferior Wall Myocardial Infarction Undergoing Primary Percutaneous Coronary Intervention. Clin Cardiol. 2011;34(4):249–53.
3. Garg KC, Pathak PK, Agrawal A. Right ventricular infarction in acute inferior myocardial infarction: importance of right precordial electrocardiography. Indian Heart J. 1984 Jul-Aug;36(4):202–205.
4. Somers MP, Brady WJ, Bateman DC, Mattu A, Perron, AD. Additional electrocardiographic leads in the ED chest pain patient: right ventricular and posterior leads. Am J Emerg Med. 2003; 21(7): 563-573.
5. Grollier G, Scanu P, Gofard M et al. « Sus décalage du segment ST dans les dérivations précordiales antérieures et infarctus du ventricule droit ». Arch Mal Coeur 1992 ; 85 :67-75.