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Original Article

Myocardial Infarction With Normal Coronary Arteries (MINCA) in Sudan: A Descriptive Observational Prospective Trial

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Abstract

In this prospective observational study at Sudan Heart Centre (Oct 2014–Nov 2015), 14 out of 72 acute MI patients (mean age 37 years, 85% male) had angiographically normal or near-normal coronary arteries (<30% stenosis). Preceding infection (42%) and regional predisposition were prominent, with 49% exhibiting LV systolic dysfunction (EF <45%) and zero in-hospital mortality.

Introduction:

MINCA is a well recognized clinical condition with a typical presentation of symptoms, signs, ECG changes, laboratory results and echocardiographic findings of acute myocardial infarction (AMI). The incidence of the condition is not well known and is probably less than 10% of those patients with AMI.

The exact cause of the syndrome is not well known. Myocarditis (or peri-myocarditis) is thought to be one of the commonest associations of the condition. Tako-tsubo stress cardiomyopathy is one of the well described causes for the condition. Coronary spasm either spontaneously or induced by recreational drugs, coronary embolism and vasculitis are also possible causes.

(MINCA) typically occurs in the under-50s1 .Usually there is no history of angina or previous myocardial infarction (MI), and risk factors for ischemic heart disease (IHD) may be absent2 .Symptoms and electrocardiographic (ECG) findings are similar to those of MI with no angiographically evident coronary disease and the infarct size tend to be smaller3 The rate of post-MI complications, such as malignant arrhythmias, heart failure and hypotension is lower and the long-term prognosis is more favorable3,4 .

Objectives:

Is to describe those patients with MINCA in terms of clinical characteristics and demographic and risk factors associations. We will also describe the clinical presentations of the disease and monitor the short term in hospital outcome. We will try to explore any clinical and shared characteristics which may shade light on possible etiology and cause.

Methodology and Study protocol:

All patients referred to Sudan Heart Centre and seen at the cath lab for coronary angiography and whose final diagnosis was an AMI were studied. These also include referred patients from other hospitals. Patients whose coronary angiography was reported as normal or near normal {defined as luminal stenosis < 30%} are included in the final analysis. Patients referred for coronary angiography from other hospitals are included only if their event was within a month of their coronary angiography date.

The definition of AMI was defined as chest pain associated with ST elevation in two adjacent leads or new onset left bundle branch block and further confirmed by a positive troponine laboratory result. We did not define a cutoff point

for the level of troponine leak since referred patients from other hospitals reported only a qualitative troponine result.

We reviewed all the cardiac tracings of the referred patients to confirm the ECG characteristics of an AMI.

Inclusion criteria:

All patients with the diagnosis of AMI as described above and undergoing coronary angiography of all age groups were included.

Exclusion Criteria:

We excluded those patients with previous history of documented IHD and patients with renal impairment. We also excluded patients with a negative\or not recorded troponine result and those patients who were admitted and diagnosed as pericarditis or myocarditis on their initial presentation.

Results:

During the study period 72 patients were sent for coronary angiography in which the indication was recent acute myocardial infarction (AMI). Of these 72 patients, 14 patients reported a normal coronary angiography or minor irregularity with an incidence of 19% (not shown). These patients represent our study group. Clinical characteristics of the 14 patients are shown in table1. The mean age of patients was 37 (18-80). 8 patients (57%) were younger than 40 years. 12 patients were males (85%) and only two were females. 8 of our patients (57%) ethnic origin or reside in the west of Sudan and 6(42%) were from other regional and ethnic areas in Sudan. One patient was hypertensive, one diabetic and only 3 patients were smokers. None of the patients has a family history of premature IHD. No history of treated hyperlipedemia in any of our patients. There was history of an infection within the last 3 months of presentation in 6 patients (42%). 3 patients with respiratory tract infection, two patients with a febrile illness treated as malaria and in one patients the site of infection was not determined but there was fever and elevated laboratory markers of active infection.

4 patients (28%) were thrombolysed and most patients who did not receive thrombolytic therapy presented outside the time window for thrombolysis.

In 6 patients (42%), the site of infarction according to the 12 lead ECG was anterior, 6 were inferior. All patients showed elevated cardiac troponine.

Echocardiography was consistent with regional wall abnormalities suggestive of AMI in 9 patients (64%) while 5 patients have normal echocardigraphic study with no regional wall dysfunction.

The mean ejection fraction of patients was 45%. The EF was normal in only 6 patients (42%) while 7 patients (49%) developed moderate to severe LV dysfunction with an EF<45%. Of the 9 patients with abnormal echocardiography, one patient showed echo features characteristic of Tako-tsubo. In spite of the significant hit to the myocardium but the in-hospital outcome was excellent with no in-hospital mortality. One patient had a ventricular tachycardia responded to cardioversion. Cardiogenic shock was not reported in any patient during hospital stay

% | number | | | 85 | 12 | sex male | | 15 | 2 | female | | | 37 | mean age | | 7 | 1 | risk factors DM | | 7 | 1 | HPTN | | 0 | 0 | Hypelipidemia | | 21 | 3 | smoking | | 0 | 0 | family history | | 42 | 6 | site of infarct ant | | 42 | 6 | inf | | 16 | 2 | other | | 93 | 13 | hospital course unremarkable | | 7 | 1 | VT | | 0 | 0 | death | | 0 | 0 | shock | | 42 | 6 | EF >55 | | 7 | 1 | 45-55% | | 28 | 4 | 35-45 | | 21 | 3 | >35 | | 28 | 4 | thrombolysis yes | | 71 | 10 | no | | 42 | 6 | preceding infection yes | | 57 | 8 | no | |

Table 1:

patients' characteristics

Discussion:

Patients with MINCA in our study were very young patients and predominantly males.

There were no appreciable conventional risk factors for IHD, suggesting an etiology other than IHD. The clinical presentation in the majority of patients was classical of an AMI with ECG features and wall motion abnormalities on echo study typical of the disease. Most patients were treated as an acute MI and hence received thrombolytic therap. In those patients who were denied thrombolysis, the reason was late presentation.

There was a high consistency and overlap between the echocardiographic and ECG indices of the site of injury. This suggests that the disease process affects the myocardium in a segmental manner most likely related to the coronary anatomy and the blood supply. There was no predilection for specific myocardial regions. More than 50% of our patients either reside in the west of the Country or their ethnic origin is from that region. The rest of patients were distributed almost equally in different regional distribution. This may suggest a possible ethnic or genetic predisposition to the disease.

There were a considerable number of patients who sustained some form of an infection close to the event and this may raise the question of possible infective etiology.

The condition was associated with significant myocardial injury and left ventricular dysfunction and thought this was not associated with grave in-hospital outcome, but the long term impact on patient's prognosis needs to be assessed by future follow up.

Conclusions:

This is a small observational trial with small number of patients and is difficult to get to any clear description of the disease. However, in this small study, MINCA represent a group of patients with no clear etiology and clinical characteristics but is no doubt not due to atherosclerosis. The condition is associated with significant damage to the myocardium and this may result on long term impact on patients. This need to be assessed in larger trials with long term follow up.

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Table 1

Characteristic	Percentage	Patients (n)
Male / Female Sex	85% / 15%	12 / 2
Mean Age	—	37 yrs (18–80)
Diabetes / Hypertension / Smoking	7% / 7% / 21%	1 / 1 / 3
Anterior / Inferior MI Site	42% / 42%	6 / 6
Ejection Fraction >=55% / 45-55% / <45%	42% / 7% / 49%	6 / 1 / 7
Thrombolysis Received	28%	4
Preceding Infection (<3 months)	42%	6

In-Hospital Mortality	0%	0