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Case Report

Stress-related cardiomyopathy due to anaphylaxis to iodinated contrast media during arteriography procedures in diabetic patient

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ABSTRACT

Anaphylaxis is an acute, severe systemic allergic reaction that can be potentially fatal. It can often transition to refractory hemodynamic instability (new onset myocardial dysfunction/ left ventricular dysfunction/LVD). Stress-related cardiomyopathy (SRC) is now emerging as a significant contributor of myocardial dysfunction and has multifactorial etiologies, including the excessive catecholamine released in intense stress conditions. It is also more likely to occur in middle aged/ postmenopausal woman. This rare case report, a SRC caused by contrast-induced anaphylaxis within 30 minutes post artheriography procedures. Management of anaphylaxis should be prompt and precise because it is considered as a medical emergency with a rapid onset of disease and potentially progress to cardiovascular and respiratory collapse causing death.

Keyword: Anaphylaxis, Allergic reaction, Iodinated contras media, Adrenaline, SRC

INTRODUCTION

Stress-related cardiomyopathy (SRC) is a major cause of cardiac dysfunction. SRC can occur in variety of circumstances, including myocardial dysfunction, LVD caused by exogenous catecholamines such as adrenaline injected during resuscitation, and new-onset LVD in few patients. It's also more common in women in their early fifties. It's linked to variety of factors, including increased catecholamine release under stressful situations.[1,2]

In the United States, over 75 million CT scans are performed each year, with iodinated contrast media (ICM) being used in half of them. ICM hypersensitivity reactions (HSRs) are becoming more common. ICM-related HSRs can be life-threatening in some situations, such as anaphylaxis.[3] Anaphylaxis is systemic hypersensitivity reaction that characterized at its most severe by bronchospasm, upper airway angioedema and/or hypotension and may cause death.[4] The prevalence of anaphylaxis to ICM is estimated to be 1:170 000, that is, 0.05-0.1% of patients undergoing radiologic studies with ICM. Due to the risk factors such as female sex, post menopause, psychological stress, chronic medications and diabetes, anaphylaxis can develop to hemodynamic instability that is known as SRC and eventually causing death.[1]

The sine qua non of therapy is triggers avoidance and adrenaline, that should never be delayed for suspected cases with closed monitor and added with other treatments (fluid, bronchodilators, antihistamines, and corticosteroids).[5]

This case with diabetes mellitus, diabetic foot (DMDF), diabetic kidney disease (DKD), anaphylaxis to ICM and SRC. She was given optimal treatment immediately and advanced life support in ICU.

The patient gave specific written informed consent for the

case information and any related photographs to be published. Ethical committee of the hospital in Denpasar, Bali, Indonesia has approved for this study protocol with the following registration number: 14/RSU/Litbang/2020. The research carried out in line with Helsinki declaration.

CASE REPORT

A 49-year-old woman with DMDF. She has diabetes history for 17 years ago, with initiated insulin injection therapy, 80 mg aspirin one daily. No history of hypertension and bronchial asthma. She was referred to Sanglah hospital for repeatly debridement. Vascular surgery department was recommended artheriograpy with ICM. On physical examination, she was fully alert, the wound of the right lower extremity is 7×8 cm with pus, necrosis. No pain, dorsalis pedis artery, posterior tibialis and popliteal arteries were palpable. Blood pressure 120/80 mmHg, pulse rate 90 times/minute regularly, axillary temperature was 36.5ºC, oxygen saturation (SpO_2) 96% on room air. The chest x-ray showed cardiomegaly (CTR 55%) and normal lungs (Figure 1).

Figure 1: Chest x-ray of cardiomegaly and normal lungs.

Right foot x-ray showed osteomyelitis of proximal metatarsophalangeal (MTP) the 5 digits of pedis dextra (Figure 2).

Figure 2: Right foot x-ray.

The laboratory results found leucocyte level (13.08×10^3 µ/L), neutrophilia (9.76×10^3 µ/L), haemoglobin level (8.66 g/dL), normal platelet 436,000, ALT (14.7 U/L), AST (13.9 U/L). Urea nitrogen (30.3 mg/dL), creatinine serum (1.62 mg/dL), total IgE tlevel (124 IU/mL), blood sugar (247 mg/dL), blood gas analysis (pH 7.41; pCO_2 39.1 mmHg; pO_2 176.4 mmHg; BEecf-0.7 mmol/L, HCO_3-24.00 mmol/L, SO_2c 99.2%, TCO_2 25.2 mmol/L), sodium (138 mmol/L), potassium (4.34 mmol/L). The patient was concluded with DMDF, chronic kidney disease (CKD) ecsusp DKD, high risk of contrast induced nephropathy (CIN). The patient was consulted to Nephrology and diabetic centre. The nephrology suggested hydration treatment by giving NaCl 0.9%/kg BW/hour for 12 hours before and after procedure, 600 mg acethylcystein each 12 hours one day before and one day after procedure. The diabetic centre unit suggested to give 4 units of short acting insulin injection subcutan each 8 hours and 8 units of basal insulin injection subcutan each 24 hours. After all the suggestions were done then followed by artheriograpy with ICM. Approximately 30 minutes post artheriography was performed, she had complaint of shortness of breath, palpitation, swelling predominantly round the eyes (angioedema), throat tightness (laryngeal edema) and some of urticaria on her chest wall and upper extremities. There was stridor, no rale, wheezing on both lungs. The hemodynamic became unstable with hypotension, hypoxia. She was still alert, blood pressure 90/50 mmHg, pulse rate 110 times/ minute regularly, axillary temperature was 36ºC, with oxygen saturation (SpO_2) 90% on room air. A 12-lead electrocardiogram (ECG) revealed sinus tachycardia no evidence of acute ischemia or prior infarction (Figure 3).

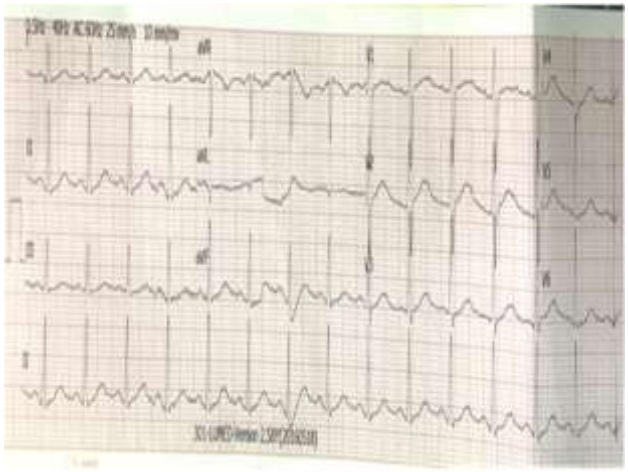

Figure 3: ECG of sinus tachycardia.

The patient was concluded with DMDF pedis dextra, DKD, anaphylaxis to ICM and SRC. Patient was given oxygenation face mask 10 L/minute, 0.3 CC adrenaline injection intra muscular (IM), 200 mg hydrocortisone injection intra venous (IV) and continued with 100 mg hydrocortisone injection IV each 8 hours. She was consulted to ear nose throat (ENT) department with

conclusion suspected laryngeal edema due to contrast, and hydrocortisone treatment be continued while nephrology suggested hydration with normal saline. One hour after observation the patient developed better.

DISCUSSION

Stress-related cardiomyopathy (SRC) is a major cause of cardiac dysfunction. SRC can occur in a variety of circumstances, including myocardial dysfunction, LVD caused by exogenous catecholamines such as adrenaline injected during resuscitation, and new-onset LVD in a few patients. It's also more common in women in their early fifties. It's linked to a variety of factors, including increased catecholamine release under stressful situations.[1,2]

Triggers and SRC risk factors

SRC is triggered by psychological and/or physical stress. A sense of impending doom, chronic diseases, or desperation are among the most common psychological stressors. Surgery, acute critical illness, extreme pain, worsening of existing diseases, and central nervous system abnormalities have all been identified as physical stressors.4 The typical SRC patient is a postmenopausal woman who has had severe, unanticipated emotional stress in the previous 1 to 5 days, accompanied by anxiety.[1]

Diabetes has been recognized as a risk factor for SRC, with 10% to 25% of individuals having the condition. Diabetes causes neuro-autonomic nerve remodeling and vasoactive neuropeptide upregulation, which may enhance sensitivity to SRC.[1-3] Other risk factors of SRC include female sex, post menopause, anxiety, diabetes, chronic medications. Prolonged history of diabetes may lead endothelial dysfunction, chronic microvascular dysfunction, impaired coronary flow reserve. A strong adrenergic stimulus may be sufficient to initiate SRC in response to psychological and/or physical stress in a susceptible individual who has enrichment in neuropeptides and risk factors for endothelial dysfunction.[1-3]

Here, we report a rare case of SRC due to anaphylaxis to ICM during artheriography procedures in diabetic patient; an adult female 49-year-old (a middle-aged woman, post menopause), with DMDF for repletely debridement.

The literature review and the case study are compared as following:[1,2] (1) The typical patient with SRC is a postmenopausal woman who has had severe, unanticipated emotional stress. Physical stressors include surgery, acute critical illness, severe pain, exacerbation of chronic diseases and central nervous system disorders have emerged as triggers; this case is a postmenopausal woman, DMDF patient which was preferred for repeat debridement. She has history of diabetes since 17 years ago, with initiated therapy including subcutaneous low dose insulin injection, 80 mg aspirin one daily, (2) Clinical characteristics include acute or subacute, chest pain (>75%), shortness of breath (about 50%), dizziness (>25%), and occasional syncope (5% to 10%); this case experienced of acute onset of shortness of breath (30 minutes post artheriography procedures), (3) The physical examination of a patient with SRC typically indicates respiratory distress, tachycardia, and hypotension; in this case we found the patient experienced of shortness of breath, palpitation (tachycardia, pulse rate 110 times/minute regularly) and hypotension (blood pressure 90/50 mmHg), (4) Without ST-segment depression on ECG, as probability of SRC; in this patient we found A 12-lead ECG revealed sinus tachycardia no evidence of acute ischemia or prior infarction.

Generally, patients with severe anaphylaxis recover if they are treated quickly and appropriately. A sufficient airway, oxygen supplementation, intravascular normal saline, and vital sign monitoring are all important first-line treatments. Adrenaline is a medication that can be used to treat serious contrast reactions. Intravenous corticosteroids at high doses can have an immediate stabilizing impact on cell membranes and can be utilized as a second-line treatment.[5]

This patient was given oxygenation face mask 10 L/minute, 0.3 CC adrenaline injection intra muscular (IM), 200 mg hydrocortisone injection intra venous (IV) and continued with 100 mg hydrocortisone injection IV each 8 hours, consulted to ENT department with conclusion suspected laryngeal edema due to contrast, and hydrocortisone treatment be continued and nephrology division suggested hydration with normal saline. The patient was close observed and one hour later she was better.

CONCLUSIONS

A rare case of SRC due to anaphylaxis to ICM induced within 30 minutes post artheriography procedure. The ICU Team should be aware that the LVD is mostly severe but fully reversible and should be managed immediately with optimal supportive therapies in ICU.

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