

A Case Report of Thrombotic Microangiopathic Malignant Hypertension

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Abstract

We represented a case of malignant hypertension with thrombotic microangiopathy. There was found no finding revealing renovascular hypertension inspite of high renin and aldosterone levels. The patient responded to aldactone that was administered because of the likelihood of primary aldosteronism regarding the causes of secondary hypertension. We aimed to point out that the laboratory tests may reflect the outcomes of microangiopathic hemolytic anemia; therefore in such circumstances it may be impossible to find out the main reason of hypertension.

Keywords: Thrombotic microangiopathic; Hypertension; Aldosteronism

Introduction

In conditions such as hemolytic uremic syndrome, disseminated intravascular coagulation, thrombotic thrombocytopenic purpura and malignant hypertension, the endothelial layer of small vessels is damaged by fibrin deposition and platelet aggregation. Malignant hypertension is a condition characterized by severe hypertension and acute ischemic complications and it is frequently complicated by a thrombotic microangiopathy (TMA). Although almost 50% of the deceased accelerated hypertensive patients die due to acute myocardial infarction [1] renal dysfunction remains an important cause of morbidity and mortality [2]. TMA can be complicated by AKI despite absence of irreversible lesions of the renal tissue and this functional renal insufficiency is due to an intense renal vasoconstriction with an arrest of the circulation to the cortex. This form of AKI may require months of dialysis before the time to recovering renal blood flow allows a return to supportive treatment [3]. In this case we aimed to point out that the laboratory tests may be influenced by the outcomes of microangiopathic hemolytic process and sometimes it may be impossible to clarify the main reason of hypertension.

Case

A 29 year old man has referred to our nephrology outpatient clinic with high urea and creatinine levels after the diagnosis of hypertension 3 months ago by the physician who examined the patient with the complaints of new onset headache, nausea and vomiting. He is a 20 package - year smoker. After he has diagnosed as hypertension he has been on treatment of 10 mg nebivolol once a day. In his initial physical examination blood pressure was 200/140 mm Hg, heart rate was 84 per minute. On inspection, there were rashes on his left lower extremity appeared 3 to 4 weeks ago. Ophthalmological examination revealed stage III hypertensive retinopathy with no papilledema. Echocardiography showed biatrial dilatation, constrictive left ventricular hypertrophy; ejection fraction was 50%. Initial laboratory tests were as following: urea 46 mg/dL, creatinine 1.9 mg/dL, potassium: 2 mmol/L, LDH 1055U/L, total bilirubine: 1.29 mg/dL (reference value: 0-1.2 mg/dL); indirect bilirubin 0.5 mg/dL (0.1-1.0 mg/dL). Urine analysis showed 2++ protein and 1+ erythrocyte. The albuminuria/creatininuria ratio (ACR) 231,7/52,9 mg/mmol. Daily urine protein excretion was 5.7 g/day. Blood count was as following: WBC: 9.300U/L, Hg 14.2 g/dL, Htc%43, platelets 124.000/uL. Haptoglobin was low as <10 mg/dL and both direct and indirect Coombs were negative. Peripheral blood smear examination showed 3-4 schistocytes in each microscopic fields of view.

C3 and C4 levels were in normal range. Anti nuclear antibody (ANA) and anti - nuclear cytoplasmic antibody (ANCA) were negative. In the light of these findings, the patient was diagnosed as Microangiopathic hemolysis (MAHA) due to malignant hypertension. As a hypertensive young patient, he was further evaluated for secondary hypertension. 24-h urine free cortisol level was 55.2 mcg/d (36-137 mcg/d), metanephrine 101 mcg/L (52-341 mcg/L), normetanephrine 350 mcg/d (88-444 mcg/d). Both renin (207 ng/ml/h (2.71-16.51 ng/ml/h)) and aldosterone [410 pg/ml (30-160 pg/ml)] levels at lying position were higher than the normal range. Thrombotic thrombocytic purpura was excluded as ADAMTS13 activity was %98 (reference value: %40-130). ADAMTS 13 was analyzed by ELISA method.

In urinary ultrasound kidneys were normal in size (left: 116×52 mm; right: 111 × 48 mm) and parenchymal echogenicity of each kidney was enhanced compatible with grade I renal parenchymal disease. Renal arterial doppler ultrasonography and renal MR angiography showed no signs regarding renal arterial stenosis. Any hormone secreting surrenal mass was excluded by MRI. Renal biopsy was performed and it showed specific signs of thrombotic microangiopathy with microthrombus formations. Immunoflorescent stainings were negative for IgA, IgG, IgM, lambda, kappa, fibrinogen, C3 and C19.

When the causes of secondary hypertension were considered, we have excluded renovascular hypertension because of the high renin and aldosterone levels. After exclusion of other causes of secondary hypertension, it was thought as due to microangiopathy as it is known that once the microangiopathy occurs, renin levels can be elevated. We have treated the patient with spironolactone 100 mg because of high aldosterone levels. Blood pressure could have been controlled by spirinolactone; meanwhile LDH levels decreased and platelet count increased. Also potassium level was normalized by treatment as it was thought to be due to secondary hyperaldosteronism. Patient is still on follow up by our nephrology outpatient clinic. His blood pressure

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is under control with spironolactone 100 mg a day and there is no abnormality on potassium, LDH and hemoglobin levels one month after discharge (Figure 1).

Discussion

We represented microangiopathic hemolytic anemia due to malign hypertension with elevated renin and aldosterone levels. Initially, as our patient is a young male, we considered the causes of secondary hypertension. We have evaluated our patient in terms of hyperaldosteronism because our patient has represented with elevated renin and aldosterone levels. However, we have not found any signs related to renovascular hypertension radiologically.

Blumenfeld and Laragh [4] suggested that hypertensive crisis can be stratified according to disorders that are caused by increased PRA levels or not and can be treated according to the PRA levels. However, in hypertensive crises, medical treatment must be initiated before the PRA level is obtained. Additionally, it also must be kept in mind that once the microangiopathy occurs, in turn, renin would increase because of the obstruction in arterioles of kidney and ischemia [5]. Another hypertensive case with hyperreninemia and hyperaldosteronism in which renovascular angiography was found normal despite of positive captopril renography and renal vein sampling was reported in the literature [6].

As a result of this mechanism, renin and aldosteron levels are not accurate parameters to distinguish primary and secondary aldosteronism; and even if there is an underlying primary aldosteronism, renin levels would be increased unexpectedly due to the microangiopathy. With regard to our knowledge, our patient was thought as primary aldosteronism with hypopotassemia and elevated blood pressure despite of high renin levels and administered spironolactone 100 mg for the treatment. We have observed rapid response to our treatment. LDH and platelet counts have been normalized while the blood pressure was under control.

According to the British Haematology Guidelines [7] treatment procedures in thrombotic microangiopathies are practiced as orientated to the underlying pathology. When we face to a hypertensive case with microangiopathy as we have seen in our case, firstly the differential diagnosis must be revealed.

In cases of severe hypertension accompanied with TMA, it is very difficult to determine whether the TMA is a form of TTP/HUS, which would respond well to plasmapheresis, or whether the TMA is a result of malignant hypertension or other disease. It is recommended to make

the decision of plasmapheresis according to the ADAMTS13 activity [8]. In our case, we have excluded TTP with normal ADAMTS13 activity and observed the patient by controlling blood pressure. By the reduction of blood pressure we have seen that the laboratory parameters have normalized and we obtained good response to the treatment.

Conclusion

In conclusion, we have pointed out that once the microangiopathy occurs in a hypertensive patient renin and aldosterone levels do not help us to make the differential diagnosis of primary and secondary aldosteronism and can mislead the clinician in terms of the reason of secondary hypertension. In terms of the treatment, patients with microangiopathy and hypertension can response well to the antihypertensive treatment and TMA can be resolved by controlling hypertension alone in time.

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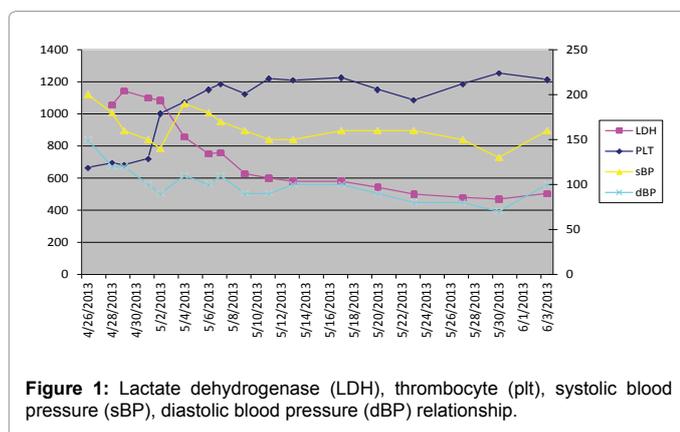


Figure 1: Lactate dehydrogenase (LDH), thrombocyte (plt), systolic blood pressure (sBP), diastolic blood pressure (dBP) relationship.