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RESEARCH ARTICLE

MASKED HYPERTENSION IN A VERY HIGH CARDIOVASCULAR RISK PATIENT: A CASE REPORT WITH REVIEW OF LITERATURE.

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Abstract

Masked hypertension is considered as one of the most important and difficult to diagnose issues of modern cardiology. Its occurrence frequency still remains a mystery. Masked hypertension cannot be diagnosed by routine medical examinations and carries an adverse prognosis, both in terms of increased target organ damage and cardiovascular events.

We report a case of a 68 years old Caucasian female with a masked hypertension and lumbar hernia, who was referred to our hospital for further management in May, 2014. Patient's past medical history was remarkable for generalized atherosclerosis and 7-year history of type 2 diabetes mellitus. In March 2013 she was diagnosed with STEMI and was undergone to the CABG surgery. In 6 months from the CABG surgery patient underwent to the endovascular treatment of Leriche's syndrome and one aortic and two iliac stents were placed. Patient was considered as a normotensive through years according to the multiple office blood pressure measurements; hence, she was not on an antihypertensive treatment. Very high cardiovascular risk profile played a crucial role for us to suspect about existence of masked uncontrolled hypertension and 24 hour blood pressure monitoring was performed. Diagnosis of hypertension was confirmed.

Arterial hypertension is considered as a leading risk-factor for cardiovascular morbidity and mortality and is associated with the increased level of global mortality; hence, to reveal existence of masked hypertension, to start adequate and early treatment and reach diurnal as well as long-term control is crucial to avoid future severe and life-threatening complications.

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Introduction:-

Blood pressure (BP) measurement techniques have always been an issue of controversy. To reach a large number of correct diagnosis of arterial hypertension (AH) and lead the optimized management of these patients, the essential step is correct measurement and interpretation of BP values. In spite of even inventor of the sphygmomanometer Riva-Rocci (1896) noticed that the simple appearance of a medical doctor was accompanied by an immediate and sometimes significant rise in BP in some patients, initial studies mostly were based on BP measurement in a medical environment, using an auscultatory method with mercury or an aneroid sphygmomanometer. High BP variability led to the development of out-of-office BP measurement techniques like self or home blood pressure monitoring (HBPM) and 24-hour ambulatory BP monitoring (ABPM). These complementary methods allow clinicians to identify four types of BP status: true normotension (normotensive by both methods), sustained hypertension (hypertensive by both methods), white coat hypertension (hypertensive based on clinic, i.e. office BP and normotensive by HBPM or ABPM) and masked hypertension (normotensive by clinic BP and hypertensive by HBPM or/and ABPM) (Hannien et al., 2010).

The term masked hypertension was proposed by Thomas Pickering in 2002; The other terms which have been used for years for this entity are reverse white-coat effect, isolated clinic normotension, isolated ambulatory hypertension, and masked uncontrolled hypertension (Bobrie et al., 2008).

Masked hypertension is defined as untreated hypertensive patients with a clinic BP < 140/90 mmHg and HBPM or daytime ABPM > 135/85 mmHg (Fagard et al. 2007). In adults, reversed white-coat effect, i.e. masked hypertension is associated with increased development of target organ damage and increased amount of cardiovascular events and carries an adverse prognosis comparable to true, sustained hypertension (Angeli et al., 2010; Kotsis et al., 2008). Most important issue is to identify patients with masked hypertension, who are either not receiving treatment that would benefit them, or who are being treated inadequately. In both cases the clinic pressure underestimates the true pressure.

The exact prevalence of Masked hypertension (MHT) is still unknown. Analysis of PAMELA study results reported a prevalence of 9% (Sega et al., 2001). Some other studies reported prevalence from 10.2 to 23% (Imai et al., 1996; Selenta et al., 2000). Since the white coat hypertension is more common in the elderly, logically MHT should gradually decline with age (Pickering et al., 2002). However, the increasing prevalence of reduced nocturnal BP dipping among older patients, could alter this consideration.

MHT is more prevalent in male elderly patients with increased BP variability. Other risk factors are smoking, alcohol consumption, high normal office BP, the overweight and a higher education level (Seki et al., 2010; Ohira et al., 2009). Presence of metabolic syndrome, diabetes mellitus, chronic kidney disease, shortened sleep time, or obstructive sleep apnoea may predispose to MHT because of nocturnal hypertension (Baguet et al., 2008; Minutolo et al., 2011; Franklin et al., 2013; Kotsis et al., 2008; Kumar et al., 2017). Some other studies showed, that nondipping or rising nocturnal BP patterns, with or without elevated daytime ambulatory blood pressure values, may be associated with the normal conventional office BP values.

Diagnosis of masked hypertension may falsely be stated in an elderly hypertensive patient who underwent to the conventional office BP measurement soon after a large meal, which may produce postprandial reduction of BP. Conventional office BP may be significantly lower than BP at work or at home, because of significant mental or physical stress out of the doctor's office. Therefore, there is a need for 24-hour ABPM with assessment of both day and nighttime BP to diagnose MHT in many conditions where it might occur and elderly population, where it is quite prevalent.

Studies have reported that associations between MHT and cardiovascular diseases are as strong as those found for sustained hypertension. It is not questionable anymore, that in comparison with normotensive subjects, MHT similar to sustained hypertension is associated with a higher left ventricular mass index and with a greater intima-media thickness (Cuspidi et al., 2015a, b; Manios et al., 2015). The Masked Hypertension Study showed that MHT and sustained hypertension determine diastolic dysfunction equally (Oe et al., 2013). It is well confirmed, that a target organ damage frequently develops in patients with MHT prior to its transitioning to sustained hypertension (Stanley et al., 2017; Tientcheu et al., 2015).

The question regarding persistence and progression of MHT lately attracted attention of many scientists. Trudel et al. in 2013 examined 1669 white-collar workers and followed them up over 5 years for the assessment of prevalence and persistence of MHR and its progression to sustained hypertension. They found out that among baseline masked hypertensive subjects, hypertension, either masked or sustained, was present in more than half after 5 years, as one-third progressed to sustained hypertension and about one out of five remained masked.

In current paper we present a case of a very high cardiovascular risk patient, with severe masked uncontrolled hypertension and generalized atherosclerosis, who was admitted to the hospital for vertebral surgery due to the lumbar hernia and with the history of coronary artery bypass graft surgery (CABG) and endovascular treatment of Leriche's syndrome 1 year prior.

Case Report:-

A 68 years old non-smoker female with body mass index of 33,7 kg/m² was referred to our hospital for vertebral surgery due to the lumbar hernia in May, 2014. She used to have very severe, unbearable pain in her waist irradiating in the right leg. After vertebral MRI, diagnosis of lumbar hernia at the L5 level was confirmed and surgical treatment was decided. Patient's past medical history was remarkable for severe atherosclerosis and 7-year history of type 2 diabetes mellitus. In March 2013 she presented in a hospital with ST segment elevation myocardial infarction (STEMI) on posterior wall with Q wave formation on ECG. Shortly after hospitalization was performed coronarography. Because of severe, multiple atherosclerotic damages and multiple hemodynamically significant stenosis of coronary arteries, bypass grafting of coronary arteries (CABG) was performed.

Patient was diagnosed with Leriche's syndrome in December 2012, but because of patient's own decision, an intervention was not performed till November 2013. Hence, in 6 months from the CABG surgery patient underwent to the endovascular treatment of Leriche's syndrome, because of severe progression of the disease. One aortic and two iliac stents were placed while the endovascular procedure.

While examination in our hospital, patient stated that she used to have high blood pressure many years ago and she was on a medical treatment, but because of normalization of blood pressure, she stopped taking antihypertensive medications. According to the information given by the patient, before and after CABG surgery she had never have higher than normal blood pressure at a doctor's office, in spite of multiple visits. At the same time she stated that she have never had tested her blood pressure level at home, because had no complains and no signs of hypertension. She had no doubts and was sure that CABG surgery helped her to improve her life quality and cured her from "possible" hypertension. "What would knowing the numbers do for me?," she asked. "The doctor already knows the BP is normal."

Prescribed medications before visiting our hospital were as follows in daily doses: Aspirin 75mg, Clopidogrel 75mg, Rosuvastatin 40mg; Gabapentin 900mg, Thiocolchicoside 8mg, Diclofenac sodium 100mg, Pantoprazole 40mg, Glimepiride 4mg, Metformin 2000mg.

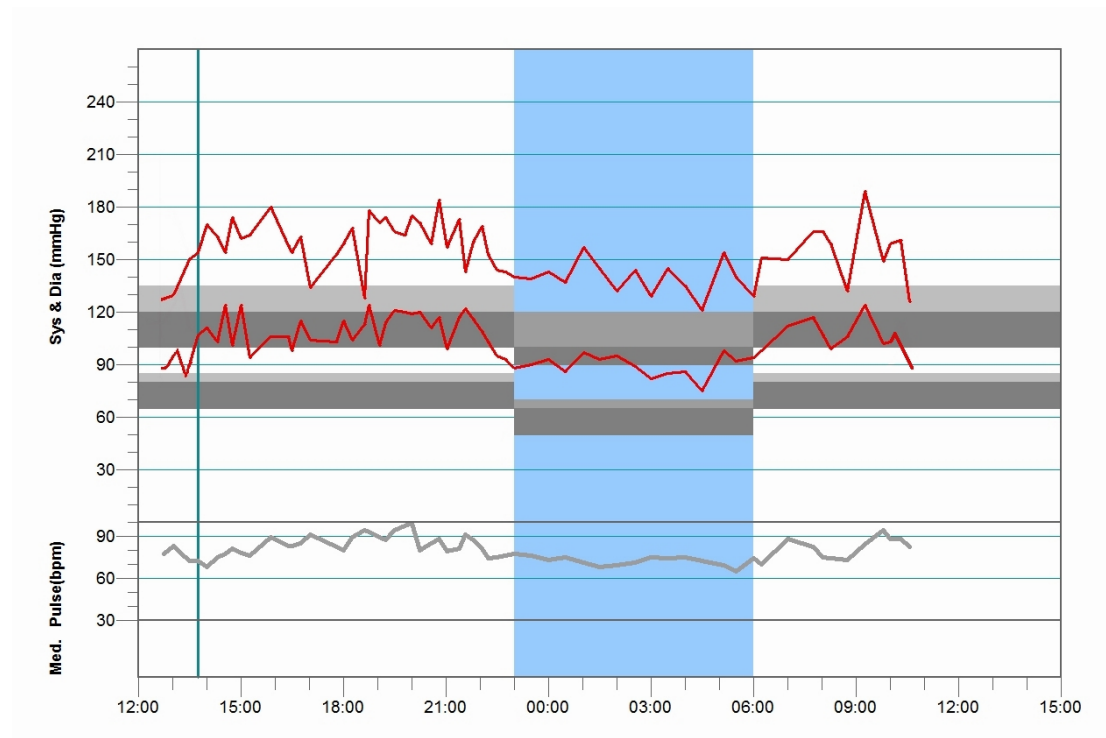
Clinical Details

Upon physical examination, there was normal and equal radial artery pulse on both sides. Blood pressure on right brachial artery was 138/88 mmHg and on left brachial artery 134/86mmHg. Clinically significant blood pressure difference between arms did not appear. Heart rate was regular, 84 bpm. Cardiac auscultation revealed a 2/6 systolic ejection murmur over the right base. Lungs were clear to auscultation. Respiration rate was 18'. Complete blood count, liver functional test, lipid profile, coagulation studies and serum electrolyte levels were normal. Erythrocyte sedimentation rate was 30 mm/h. Creatinine, fasting blood glucose and fibrinogen levels in blood were 1.3 mg/dL, 11.1mmol/L and 650 mg/dL, respectively. Micro-albuminuria and slightly increased C-reactive protein level were detected. 12-lead ECG demonstrated sinus rhythm with QS complexes, ST segment and T wave abnormalities, characteristic for old inferior wall myocardial infarction. Transthoracic echocardiography revealed mild inferior hypokinesia.

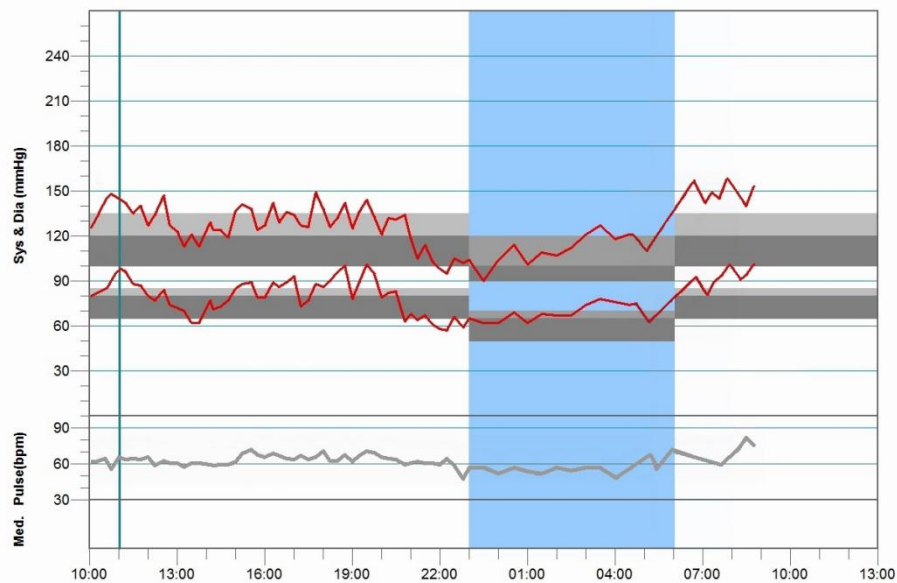
Taken into account the patient's medical history and highest susceptibility for having arterial hypertension, in spite of normal office BP on different visits, 24-hour ABPM was performed. ABPM was obtained with WatchBP 03 recorder. ABPM was performed in accordance with "The Guideline of the Working Party on Blood Pressure Monitoring of the European Society of Hypertension".

A noninvasive ABPM device was attached to the upper left arm. The device was set to measure blood pressure at 15-minute intervals during the daytime (between 7_{AM} and 11_{PM}) and at 30-minute intervals during the nighttime (between 11_{PM} and 7_{AM}). ABPM revealed, that BP load during the daytime, as well as nighttime was higher than normal in 100% cases. In white coat window (an average of 4 consecutive readings from the beginning), maximal systolic and diastolic blood pressures were 134 mmHg and 82 mmHg, respectively. An average systolic and diastolic blood pressures during whole examination period were 156 mmHg and 98 mmHg, respectively. Patient had dipper circadian blood pressure profile with nighttime dipping of 12.5% for systolic and 19.1% for diastolic blood pressure. Diurnal curves of systolic and diastolic blood pressure and heart rate are presented on Figure 1.

Figure 1. Diurnal curves of systolic and diastolic blood pressure initially.



Patient was advised for less salt consumption and to the prescribed medical regimen was added Bisoprolol 5mg, Perindopril 10mg, Amlodipine 10mg. In 2 weeks 24-hour ABPM was repeated. Systolic, as well as diastolic blood pressures were significantly decreased, but still beyond the normal range (Figure 2). Indapamide 2.5mg was added to the treatment plan.

Figure 2:-Diurnal curves of systolic and diastolic blood pressure after 2 weeks from treatment initiation.**Discussion:-**

Epidemiological studies of hypertension were initially based on blood pressure measurement in a medical environment i.e. office blood pressure measurement, using the auscultatory method with sphygmomanometer. High blood pressure variability led to the development of complementary measurement methods, such as a self measurement of blood pressure at home and 24 hour ambulatory blood pressure measurement. Over the past 25 years, ABPM and home blood pressure monitoring have been shown to be better correlated with target organ damage than conventional measurement in an office (Bobrie et al., 2008).

Masked hypertension is considered as one of the most important and difficult to diagnose issues of modern cardiology. Its occurrence frequency still remains a mystery at the population level. Masked hypertension cannot be diagnosed by routine medical examinations and carries an adverse prognosis, both in terms of increased target organ damage and cardiovascular events (Pickering et al., 2007; Liu et al., 1999).

It seems clear that masked hypertension should be taken seriously. It is a phenomenon worthy of further investigation. It would clearly be inappropriate to argue that everyone should be screened with ABPM to reveal masked hypertension, but there are many patients who are referred for suspected hypertension who turn out to have normal clinic pressures on repeat testing, like a patient from our clinical case. Perhaps, like our presented patient, very high cardiovascular risk profile played a crucial role for us to suspect about existence of masked uncontrolled hypertension and 24 hour ABPM was performed, which confirmed diagnosis of arterial hypertension.

Nowadays arterial hypertension is considered as a leading risk-factor for cardiovascular morbidity and mortality and is associated with the increased level of global mortality; hence, to reveal its existence, to start adequate and early treatment and reach diurnal as well as long-term control is crucial to avoid future severe and life-threatening complications. Hence, patients especially with high or very high cardiovascular risk profile would benefit from ABPM to rule out masked hypertension, improve prognosis and avoid serious cardio- and cerebrovascular complications.

Conclusion:-

Masked hypertension is a clinical entity which needs to be assessed in at high risk population. Its identification is fully dependent on ABPM or home blood pressure monitoring techniques. Once identified, adequate management strategies should be initiated. As early is revealed sustained or/and masked hypertension, as better prognosis should be expected. In patients with sustained hypertension, as well as with masked hypertension adequate medical treatment and lifestyle changes are mandatory.

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