Necessity of Coagulation Profile in Preeclampsia

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Abstract

Objective: To evaluate the clinical utility of the currently used laboratory studies, especially coagulation tests, in the evaluation of the patients with preeclampsia.
Materials and Methods: We evaluated the coagulation profile, platelet count, serum levels of lactate dehyrogenase (LDH) and transaminases of 120 preeclamptic patients (October 1999-March 2000).
Results: LDH levels were above 240 U/ml in 52 patients. Thrombocytopenia and elevated liver enzymes were observed in 32 patients. The coagulation profile was within the normal limits in 68 patients. The sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of LDH levels in prediction of prolonged aPTT is 100% (2/2), 57.6% (68/118), 3.8% (2/52) and 100% (68/68) respectively. The sensitivity, specificity, PPV and NPV of an abnormal LDH in prediction of prolonged PT are 83.3% (5/6), 58.8% (67/114), 9.2% (5/52) and 98.5% (67/68) respectively. Overall, increased LDH level has a sensitivity of 85.7% (6/7), specificity of 59.3% (67/113), PPV of 11.5% (6/52) and NPV of 98.5% (67/68) in the setting of a prolonged PT and or aPTT.
Conclusion: The coagulation profile is not a necessary test in the initial workup of preeclamptic patients. In patients with LDH levels <240, it is not cost-effective to study coagulation profile.

Keywords: preeclampsia, coagulation profile, lactate dehydrogenase

Özet

Preeklampside Koagülasyon Profilinin Gerekliliği

Amaç: Preeklampsili hastaların değerlendirilmesinde günümüzde kullanılan laboratuvar testlerinin, özellikle koagülasyon testlerinin, klinik yararını araştırmak.
Materyal ve Metot: 120 preeklamptik hastanın koagülasyon profili, trombosit sayısı, serum LDL düzeyleri ve transaminazlarına bakıldı (Ekim 1999-Mart 2000).
Sonuçlar: Serum LDH seviyeleri 52 hastada 240 U/ml'den yüksekti. Trombositopeniye ve yükselmiş transaminazlara 32 hastada rastlandı. Koagülasyon profili 68 hastada normaldi. LDH'nin uzamış aPTT'yi tespit etmedeki duyarlılığı, özgüllüğü, pozitif tahmin değeri (PPV) ve negatif tahmin değeri (NPV) sırasıyla %100 (2/2), 5%7.6 (68/118), %3.8 (2/52) ve%100 (68/68) olarak bulundu. Uzamış PT'yi tespit etmek için bu değerler sırasıyla, %83.3 (5/6), %58.8 (67/114), %9.2 (5/52) ve %98.5 (67/68) olarak bulundu. Genel olarak LDH'nin uzamış aPTT ve/veya PT'yi tespit etmedeki duyarlılığı, özgüllüğü, PPV'si ve NPV'si sırasıyla 85.7% (6/7), 59.3% (67/113), 11.5% (6/52) ve 98.5% (67/68) olarak tespit edildi.
Tartışma: Koagülasyon profili preeklamptik hastaların ilk değerlendirmesinde mutlaka gerekli olan bir test değildir. LDH'si 240 U/ml'nin altında olan hastalarda koagülasyon profiline bakılması maliyet etkinlik açısından uygun değildir.

Anahtar sözcükler: preeklampsi, koagülasyon profili, laktat dehidrogenaz

Introduction

Hypertensive disorders of pregnancy complicate about 7-10% of all pregnancies (1). The etiology of pregnancy induced hypertension (PIH) is still unknown despite intensive research being undertaken worldwide. This fact contributes to the confusion that exists around the classification of the disease as well as the diagnosis and treatment.

It was the intent of the present study to evaluate the clinical utility of the currently used laboratory studies in the evaluation of the patients with preeclampsia. It was also the intent of this study to evaluate cost savings to patients, as determined by hospital charges.

Materials and Methods

We studied 120 hypertensive pregnant women hospitalized with the presumptive diagnosis of preeclampsia and

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cared for on the inpatient services of Zekai Tahir Burak Women's Health Education and Research Hospital. The criteria for preeclampsia included the following: A- Blood pressure of at least 140/90 mmHg after 20 weeks for gestation on at least two consecutive measurements B- Proteinuria, defined as urinary excretion of 0.3 g protein or higher in a 24-hour urine specimen (2). Blood pressure was measured in all patients according to the recommendations of Working Group and related reports (2,3). All subjects had their first complete blood count (CBC), blood urea nitrogen (BUN), serum creatinine, prothrombin time (PT), activated partial thromboplastin time (aPTT), fibrinogen, serum glutamic-oxaloacetic transaminase (SGOT), serum lactate dehydrogenase (LDH), serum glutamic-pyruvic transaminase (SGPT) and total bilirubin levels as initial laboratory evaluation. Thrombocytopenia was defined as a platelet count less than 100 000/mm^3. Hypofibrinogenemia was defined as a fibrinogen level less than 200 mg/dl. We considered PT, aPTT, SGOT, SGPT and LDH were abnormal when the levels were more than 14 seconds, 40 seconds, 37 U/ml, 40 U/ml and 240 U/ml respectively.

Results

In 52 of the preeclamptic patients LDH levels were above 240 U/ml. The levels were between 240-1000 U/ml in 35, 1000-2000 U/ml in 12 and 2000-3000 U/ml in 5 of the cases. Thrombocytopenia and elevated liver enzymes were observed in 32 patients. The coagulation profile was within the normal limits in 68 patients. The role of an abnormal LDH level as a predictor of coagulation test outcome was depicted in Table 1. Among patients with LDH levels >240 U/ml 2 of them had prolonged aPTT (> 40 seconds) and the remaining 50 patients had normal aPTTs (<40 seconds). None of the patients with LDH levels <240 U/ml had prolonged aPTT. Thus the sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of LDH levels in prediction of prolonged aPTT is 100% (2/2), 57.6% (68/118), 3.8% (2/52) and 100% (68/68) respectively (Table 1).

PT was found to be prolonged (>14 seconds) in 5 of the patients with a LDH >240 U/ml. Only one patient had a prolonged PT of 18.1 seconds among patients with a LDH level of <240 U/ml whose aPTT and fibrinogen level were normal. Sensitivity, specificity, PPV and NPV of an abnormal LDH in prediction of PT are 83.3% (5/6), 58.8% (67/114), 9.2% (5/52) and 98.5% (67/68) respectively (Table 1).

Overall, increased LDH level has a sensitivity of 85.7% (6/7), a specificity of 59.3% (67/113), a PPV of 11.5% (6/52) and a NPV of 98.5% (67/68) in the setting of a prolonged PT and or aPTT (Table 1).

Discussion

Preeclampsia is a disease peculiar to pregnancy that often results in multi-organ failure. To reduce the maternal-perinatal morbidity and mortality to a minimum, we have to use correct and necessary laboratory tests for the diagnosis of complications of hypertensive disorders of pregnancy. Establishment of complications depends on many signs and symptoms as well as laboratory tests. However, which tests should be ordered is uncertain largely because of a lack of data defining the clinical usefulness of the many available tests.

Multiple analyses were done to identify a predictor test or combination of tests that would accurately identify abnormal PT, aPTT and fibrinogen results. One of them was a study performed by Barron et al. The data from that study indices that in a population of gravidas being tested for a hypertensive disorder, the prevalence of clinically significant perturbations of coagulation studies was extremely low (4).

Leduc observed that when monitoring intrapartum coagulation indices in preeclampsia, one can safely follow only the platelet count at admission and subsequently reserving PT, aPTT and fibrinogen levels for those cases complicated by counts less than 100 000/mm^3 (5). Sharma also observed the same findings as the previous study (6).

Kramer tried to determine the utility of evaluating coagulation function in patients with chronic hypertension, transient hypertension, preeclampsia, eclampsia and the HELLP syndrome (7). He concluded that measurement of the PT and aPTT in the evaluation of preeclampsia/eclampsia can be avoided if the platelet count and liver enzymes are normal. This results in a decrease in hospital charges and no compromise in patient safety.

Serial determinations of the platelet count and serum LDH were analyzed retrospectively in a study performed by Rinehart (8). The rate of change of platelets and LDH appeared to correlate well with eventual syndrome severity and this can be used to enhance patient assessment beyond the value of a single test for either laboratory parameter.

Table 1. Characteristics of LDH as a test for coagulation abnormality

	Sensitivity	Negative predictive value	Specificity	Positive predictive value
aPTT >40 seconds	2/2 (100%)	68/68 (100%)	68/118 (57.6%)	2/52 (3%)
PT >14 seconds	5/6 (83.3%)	67/68 (98.5%)	67/114 (58.7%)	5/52 (9.6%)
aPTT >40 seconds or PT >14 seconds	6/7 (85.7%)	67/68 (98.5%)	67/113 (59.3%)	6/52 (11.5%)

In our analysis we considered the sensitivity, specificity, positive and negative predictive values of elevated LDH with reference to abnormalities of the coagulation profile. Our finding of a low prevalence of coagulation abnormalities in patients with preeclampsia is also consistent with those of several previous studies. The small number of patients with the abnormalities in the coagulation profile is a limitation of our study and this also accounts for the low positive predictive value.

These results confirm that a substantial amount of expensive and unnecessary tests were done in the initial evaluation of preeclamtic patients. Prolongation of either the PT or aPTT is uncommon and likely to be clinically insignificant in the absence of other causes of coagulopathy. We recommend that the LDH with or without platelet count should be assessed in the evaluation of coagulation abnormalities in the preeclamtic patients. This approach should result in a reduction in patient charges without hindering patient care at a time of significant pressure to constrain health care costs.

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