Clinical Research on Foot & Ankle

Diabetic Foot Ulcer Patients

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Abstract

To investigate whether fibrinogen levels are a valuable biomarker for assessing disease severity and monitoring disease progression in patients with diabetic foot ulcers. A retrospective study was designed to investigate the usefulness of fibrinogen in assessing disease severity in her DFU patients who were admitted to our hospital between January 2015 and January 2016. A total of 152 her DFU patients were included in the study group, 52 were age- and sex-matched diabetic patients, but DFU was not included as a control group. DFU severity was assessed using the Wagner criteria. Patients with DFU were divided into two subgroups based on Wagner criteria. Mean fibrinogen levels were significantly higher in her DFU grade $\geqq 3$ patients than in those with DFU grades 1-2. Using ROC statistics, a cutoff value of 5.13 g/L indicated a cleavage potential with a sensitivity of 81.8% and a specificity of negative predictive value of 78.9%. Fibrinogen levels were found to correlate with CRP levels, neutrophils, and WBC counts. Fibrinogen levels may be a valuable tool for assessing disease severity and monitoring disease progression in DFU patients.

Keywords: Foot Ulcer; DFU patients

Introduction

Diabetic foot ulcers (DFU) are a complication of diabetes and have a significant impact on the cost and quality of life of people with diabetes. DFU is still known to be the leading cause of non-traumatic lower extremity amputation. The prevalence of DFU in hospitalized patients is 4-10%, and the lifetime risk of developing foot ulcers in diabetics has been reported to be as high as 25%. Early assessment of her DFU in a diabetic patient is critical and remains a challenging task for clinicians [1]. In DFU, inflammatory events impair the wound healing process and polymorph nuclear neutrophil proliferation amplifies tissue damage until chronic wounds develop. A hallmark of DFU is a prolonged acute phase response. The acute-phase reactants C-reactive protein (CRP), white blood cells (WBC), neutrophil counts, and platelets are commonly used predictors of amputation in DFU patients, but the severity of DFU disease is to a small degree of precision [2].

Another simple and potent marker of inflammation is the acute-phase protein fibrinogen, which is putatively elevated in diabetic podiatrists. Although DFU patients have been shown to have higher levels of fibrinogen than patients without ulcers, more data are needed to clarify whether fibrinogen levels are valuable in predicting diabetic podiatry outcome. A detailed study needs to be performed. The aim of this study was to examine the prognostic value of fibrinogen levels for monitoring disease progression in DFU patients. This retrospective study evaluated the diagnostic value of fibrinogen levels for disease severity in 152 DFU inpatients hospitalized at Shandong Provincial Hospital affiliated with Shandong University from January 1, 2014. 2015 to January 2016. The control group consisted of 52 people with diabetes who were hospitalized for diabetic complications instead of DFU, whose participants were matched for age and sex [3-5]. Although 206 patients with DFU were retrospectively reviewed, only 152 met the inclusion criteria, as they had complete blood counts with differential leukocyte and fibrinogen taken before at the start of any treatment and also medical records. The 152 patients with DFU also met the following criteria: no previous corticosteroid treatment; no hematologic disorders or cancer. DFU is classified according to the Wagner classification. Level 1: superficial ulcers that do not involve tendons, capsules, or bones; Level 2: penetration of deep ulcers into tendon sheaths or joints; Level 3: deep ulcers with osteomyelitis abscess; level 4: local gangrene; level 5: Extensive gangrene requires amputation. Data on age, sex, duration of illness and other medical history were extracted from hospital databases. Physical examination included blood pressure (BP) and anthropometric measurements including height, weight, and BMI. BMI is calculated as weight (kg) divided by height (m)2. Venous blood was collected after 12 h of overnight fasting to check for fasting blood glucose (FPG) and glycated hemoglobin (HbA1c). Complete blood count, fibrinogen, and CRP were also recorded for each participant after admission. Plasma fibrinogen was measured by immunoturbidimetric assay and all completed blood count analyzes were performed in our hospital's hematology laboratory [6-9].

Foot Ulcer

In this study, we evaluated fibrinogen as a marker of disease severity in patients with DFU. Our results show that people with diabetes and DFU have elevated fibrinogen levels compared with people with diabetes but without DFU. Elevated fibrinogen levels were found to confer high sensitivity, specificity, and prognostic value in patients with DFU, suggesting superiority of fibrinogen over CRP. CRP levels > 10 mg/L may reflect acute inflammation. In our study, elevated fibrinogen values were found in both DFU grade 3 groups with and without elevated CRP levels providing evidence that fibrinogen can be considered as an independent diagnostic marker. to estimate disease severity, independent of CRP levels [10]. The predictive superiority of fibrinogen found in our study may be due to its more stable properties compared to CRP. Complications from foot ulcers are the leading cause of hospitalization and amputation in diabetics, resulting in significant health care costs, as evidenced by 20-40% of health care resources being spent. for diabetic feet. In this study, the hospital stay of amputation patients was significantly longer than that of DFU patients with no amputation data shown. Therefore, it is important to find effective markers to assess disease severity and also to tailor

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therapy. Although clinical, radiological, and laboratory indicators are used to assess disease severity in patients, a large number of methods have also been investigated to diagnose DFU and determine severity. severity of the disease. Furthermore, despite the role of inflammation in the pathogenesis of DFU, there are few data on the role of systemic inflammation in patients with DFU. This study was designed to evaluate the role of fibrinogen, an acute phase protein, in estimating DFU severity in combination with other clinical and biochemical indicators of severity. Although no single serum marker is ideal for predicting disease severity, white blood cell counts, neutrophil counts, platelet counts, and CRP concentrations are used in the diet. routine clinical practice to determine disease progression DFU. These parameters may vary with the degree of inflammation, but they do not fully reflect disease severity due to the lack of data on their sensitivity and specificity. CRP appears to be more promising in predicting DFU severity and treatment outcome. A study of 85 people with diabetes and a total of 90 infected limbs treated with percutaneous coronary angioplasty. It was found that 66 cases were successfully saved while 24 cases required subsequent amputation. The study showed that the optimal CRP level in the primary amputation group before ATP in patients with DFU was calculated to be 50 mg/L with a sensitivity and specificity of 70.7% and 81.8%, respectively. that reduced CRP levels may serve as a major predictor of ATP success in individuals with diabetes and infected foot ulcers. A more recent study reported that the CRP threshold in individuals with diabetes for the diagnosis of osteomyelitis was 14 mg/L with a sensitivity and specificity of 85% and 83% respectively. In the present study, the CRP cutoff for estimating amputation was 28.18 mg/L with an overall accuracy of 80.1%, sensitivity of 73.7%, and specificity of 89.1%. .

Conclusion

The present study demonstrated that fibrinogen levels were significantly increased in patients with DFU and correlated with clinical and laboratory indicators. Fibrinogen in combination with other inflammatory markers can estimate the severity of DFU disease. If our data can be confirmed by further trials, then we believe that a standardized cut-off value for fibrinogen will facilitate monitoring of disease progression. We therefore propose that fibrinogen, as an inexpensive and easily applicable test, is a valuable tool for rapid assessment of DFU disease severity for prompt and effective treatment.

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