The Perioperative Importance of Congenital Fibrinogen Deficiency in Spinal Surgery Procedure

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ABSTRACT

Herein we present a case of a patient who was surgically treated for lumbar degenerative disc disease who demonstrated complications involving congenital fibrinogen deficiency. This case report emphasizes the importance of coagulopathy resulting from fibrinogen deficiency during spinal surgical procedures and the necessity of a proper preoperative diagnosis.

Key words: *Fibrinogen deficiency, spinal surgery, degenerative disc disease*

Kongenital Fibrinojen Eksikliğinin Spinal Cerrahi Prosedürlerde Perioperatif Önemi

Burada lomber degeneratif disk hastalığı nedeniyle spinal cerrahi girişimi uygulanan ve aynı zamanda konjenital fibrinojen eksikliği bulunan bir olgu rapor edildi. Bu olguda fibrinojen eksikliğine bağlı koagülopatinin spinal cerrahi girişimlerdeki önemi ve operasyon öncesi tanımlanmasının gerekliliği üzerinde duruldu.

Anahtar kelimeler: *Fibrinojen eksikliği, omurga cerrahisi, dejeneratif disk hastalığı*

INTRODUCTION

Spinal surgical procedures for patients with congenital blood coagulation disorders can be performed with confidence and with an acceptable low incidence of complications (1). During spinal surgical procedures, especially complex procedures, blood coagulation disorders should be considered preoperatively during the preparation of the patient for the operation. Once a blood coagulation disorder has been diagnosed in the preoperative stages and after necessary measures have been taken, life-threatening complications can be avoided and successful surgical treat-

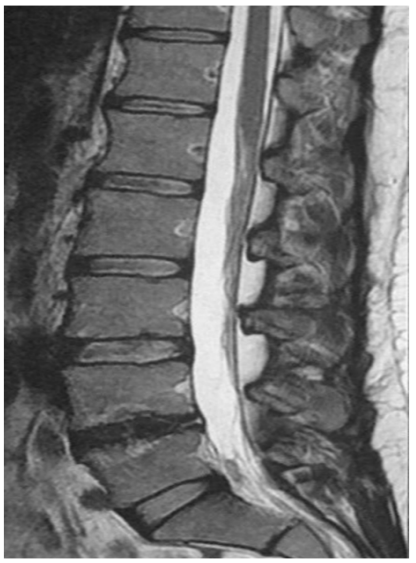

***Figure 1**. Preoperative Sagittal MR imaging*

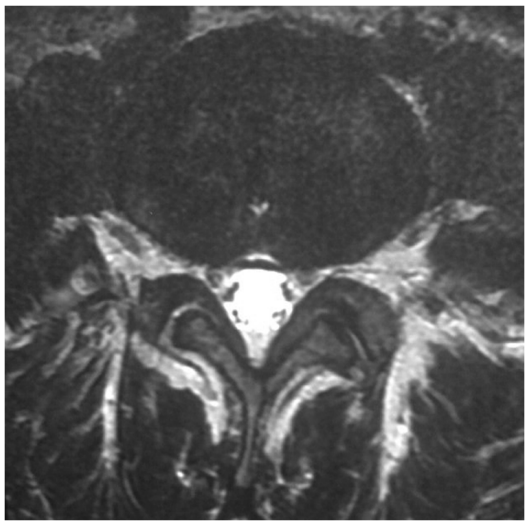

***Figure 2**. Preoperative Axial MR imaging*

ments can be performed (2). Herein, we describe the diagnosis of postoperative fibrinogen deficiency in a patient who was taken into surgery for lumbar degenerative disc disease. In this report, we emphasize the importance of such diagnoses made prior to surgical treatment.

CASE

A 33-year-old female patient was admitted to our clinic complaining of severe back pain over the previous year. Although she received medical treatment and physical therapy during this period, the lower back pain was not alleviated. Upon physical examination, we observed localized pain at the L5 root dermatome. Magnetic resonance imaging (MRI) revealed that the L4-L5 black disc was characterized by an annular tear and underwent type 1 modic changes in the end plates of these levels. Notably, all of the other discs were healthy. The patient was diagnosed using both MRI technology and discogram analysis. Provocative pain was positive from the results of the discogram. The posterior dynamic stabilization system, Cosmic (Ulrich Gmbh & Co. KG, Ulm, Germany), was utilized to stabilize the L4-L5 segment via a posterior surgical approach. During the operation, we encountered abnormal bleeding that started as soon as the initial skin incision was performed. The patient received two units of isogroup erythrocyte suspension during the operation. The patient's drainage was taken away at 48 hours following the operation. Preoperative and postoperative laboratory results were analyzed for blood coagulation disorders. In the preoperative laboratory study, the hemoglobin count was 11.7 g/dL while the white blood cell count was 6.400 g/dL. In addition, the prothrombin time (PT) was determined to be 14.5 sec (normal range 10 to 15 sec), and the activated partial thromboplastin time (aPTT) was 33.4 sec (normal range 24 to 32 sec). At the end of the operation, the PT was found to be 13.0 sec, the aPTT was 34.3 sec (above normal), the plasma fibrinogen (Fb) count significantly decreased to 69.9 mg/dL (normal range 180 to 400 mg/dL), and the Fb% count was 13.1% (normal range is above 50%). The postoperative laboratory examination showed that the tests for blood coagulation disorders such as antithrombin-III activity, protein-C activity, protein-S activity, factors V, VII, VIII, IX, X, XI, XII activities, and the von Willebrand factor activity were all within normal ranges. Moreover, no new hemorrhaging was observed during the postoperative stages.

DISCUSSION

Fibrinogen deficiency can be congenital or acquired (3). Congenital fibrinogen deficiency results in a rare coagulation disorder (4) previously described by Rabe and Solomon (5), which usually manifests itself following trauma. Although the nature of acquired fibrinogen de-

ficiency is nonspecific, it is commonly related to metastatic carcinoma. This deficiency can also be related to complications that arise during pregnancy, including fetal mortality, placenta aplasia, and amniotic embolism (pregnancy defibrination syndrome) (3, 6). Congenital fibrinogen deficiency is a rare autosomal recessive disorder that is characterized by partial or the complete absence of fibrinogen (7,8).

Hypofibrinogenemia is verified through the observation of a decrease in plasma fibrinogen levels. Regardless of the cause, laboratory findings in fibrinogen deficiency show extended bleeding time, increased PT and aPTT, and plasma fibrinogen levels below 100 mg/dL. In this case, the preoperative and postoperative PTs were within the normal range. However, the aPTT was longer in the pre- and postoperative examinations. The patient's preoperative fibrinogen level was not examined. However, the patient's postoperative fibrinogen level was 69.9 mg/dL, which is far below the normal range expected at postoperative day 30.

Bleeding due to fibrinogen deficiency is treated by the use of whole blood, plasma, cryoprecipitate, fibrinogen concentrate, or freshly frozen plasma. The half-life of fibrinogen in the body is five days. Therefore, repetitive fibrinogen infusions are usually unnecessary (9, 2, 3, 10). Notably, three main surgical principles must be considered when treating patients with blood coagulation disorders. The first, and most important, is that careful intraoperative hemostasis should be maintained. Second, surgical techniques must involve gentle manipulation of the tissues and attentive suture placement methods. Third, to prevent postoperative complications, a careful preoperative evaluation with specific factor replacements should be considered.

Notably, we were not aware that our patient had a blood coagulation disorder during the preoperative stage of treatment. Once we encountered abnormal bleeding, we suspected a coagulation disorder. All of the required laboratory studies were utilized to diagnose any possible coagulation disorders at postoperative day 30. As a consequence of this thorough analysis, a disorder involving a partial lack of fibrinogen was diagnosed. Because the patient did not exhibit any other illness, we evaluated the coagulation disorder as congenital hypofibrinogenemia. The patient had a previous history of bleeding during dental cleaning treatments and bleeding during minor trauma. However, the patient only informed us of this phenomenon postoperatively. After the operation, we learned that the patient's parents and relatives had a history of bleeding disorders.

When preparing for surgical operations, the possibility of blood coagulation disorders should always be considered. This is especially true before performing complex spinal surgical procedures. Dissection is widely used in such complex surgeries, and invasive procedures are applied to widely defined surgical areas. Preoperatively, we evaluated all of our patients' coagulopathy parameters by determining their PT and aPTT. After this experience, we propose that blood fibrinogen levels and Fb% values should be included in the preoperative coagulometer examinations if PT and aPTT levels are high. This additional test could prevent potentially life-threatening perioperative complications.

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