

Abstract number: 11254

Possibility of predicting whether the tumor is benign or malignant from laboratory data

Taketsugu FUJIBUCHI, Joji MIYAWAKI, Teruki KIDANI, Hiromasa MIURA

Department of Bone and Joint Surgery

Ehime University School of Medicine

Background

Soft tissue sarcomas are rare tumors and they are classified into many subtypes. Many cases can be difficult to diagnose as a benign or malignant tumor. Therefore, they are often misdiagnosed as a benign tumor, resulting in a delay in accurate diagnosis or an unplanned resection, which may result in poor prognosis. If simple clinical data can predict that a tumor is benign or malignant, it would be a useful tool in the diagnosis of soft tissue tumors.

Purpose

This study aimed to clarify the relationship between the diagnosis of benign or malignant tumor and the age of patient, sex, tumor size, depth of the lesion, white blood cell (WBC) counts, hemoglobin (Hb) serum C-reactive protein (CRP) level, and lactose dehydrogenase (LDH) level.

Patients and Methods

This is a retrospective case-control study. A total of 418 patients with a primary soft tissue tumor who were treated at our institution between April 2003 and March 2013 were reviewed. Patients with recurrent tumor, cancer metastasis, or infectious disease were excluded. Among them, 340 cases were benign soft tissue tumors and 78 cases were malignant soft tissue tumors. Age (≥ 60 years vs. < 60 years), maximal tumor size (≥ 5 cm vs. < 5 cm), depth of the lesion (deep vs. superficial), sex, WBC counts ($> 9100/\mu\text{l}$ vs. $\leq 9100/\mu\text{l}$), Hb (≥ 11.3 g/dL vs. < 11.3 g/dL), the level of CRP (> 0.20 mg/dL vs. ≤ 0.20 mg/dL), and LDH (> 253 IU/L vs. ≤ 253 IU/L) were evaluated for relationship with diagnosis of benign or malignant tumor. Significant variables identified in the univariate analysis were evaluated by multivariate analysis. A value of $p < 0.05$ was considered to be significant in all statistical analysis. Statistical analysis was performed using JMP version 11.

Results

The most common diagnoses were lipoma (113 cases), followed by schwannoma (74 cases) and hemangioma (32 cases) in the benign tumor group and atypical lipomatous tumor/well differentiated liposarcoma (20 cases), followed by

malignant fibrous histiocytoma including myxofibrosarcoma (13 cases) and leiomyosarcoma (7 cases) in the malignant tumor group. In univariate analysis, sex (45 males, 33 females for malignant tumors; 159 males, 181 females for benign tumors), and Hb level (69 normal, 9 low for malignant tumors; 322 normal, 18 low for benign tumors) had no association with the diagnosis. A significant relationship was identified between age (48 older, 30 younger age for malignant tumors; 149 older, 191 younger age for benign tumors), tumor size (69 large, 9 small for malignant tumors; 149 large, 191 small tumors), depth of the lesion (62 deep, 16 superficial for malignant tumors; 202 deep, 138 superficial for benign tumors), WBC counts (10 high, 68 normal for malignant tumors; 15 high, 325 normal for benign tumors), CRP level (27 high, 51 normal for malignant tumors; 53 high, 287 normal for benign tumors), LDH level (16 high, 62 normal for malignant tumors; 18 high, 322 normal for benign tumors), and diagnosis (age: $P = 0.006$, size: $P < 0.001$, depth: $P = 0.001$, WBC: $P = 0.013$, CRP: $P < 0.001$, LDH: $P < 0.001$). In multivariate analysis, large tumor size, deep location, high LDH level were risk factors for malignant tumors (size: odds ratio = 7.14, 95%CI = 3.53-10.08, depth: odds ratio = 2.05, 95%CI = 1.08-4.08, LDH: odds ratio = 3.95, 95%CI = 1.72-9.17).

Conclusions

Diagnosis of soft tissue tumors is made from clinical studies, imaging studies, and pathological findings of biopsy specimen. The ability to predict whether a tumor is benign or malignant from simple clinical data, i.e., laboratory data, tumor location, or tumor size, may help to avoid misdiagnosis and improve a patient's prognosis. It would also help to determine whether the patient should be referred to a musculoskeletal tumor specialist. In a previous report, large tumor size has been shown to be a risk factor for malignancy. Although it has been reported that a high CRP level is a risk factor for poor prognosis in soft tissue sarcoma, there have not been reports about the relationship between serum CRP level and diagnosis of soft tissue tumors. Additionally, there were no reports about the relationship between LDH level and diagnosis nor prognosis. In this study, deep location, large tumor size, and high LDH level appear to be risk factors for malignant tumors. These simple imaging and laboratory data would serve as useful information to determine whether the tumor is benign or malignant.