Successful treatment of a recurrent chest wall desmoid tumor with cyclooxygenase-2 inhibitors

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Desmoid tumors are monoclonal fibroblastic proliferation tumors with a highly invasive nature but no metastatic capacity. Radical surgical resection has been the standard treatment, with a goal of achieving negative margins; however, a previous study indicated that surgical treatment alone often fails to achieve control despite adequate surgical resection with negative margins.¹

Recently, the catenin (cadherin-associated protein) beta 1 (*CTNNB1*) gene mutation has been reported to be associated with the outcome of surgical treatments as well as the response to systemic therapies.² The efficacy of meloxicam, a selective cyclooxygenase-2 (COX-2) inhibitor, for desmoid tumors has also been reported to be correlated with *CTNNB1* gene mutation status.³

We herein report a case of postoperative recurrence of desmoid tumor arising in a patient's chest wall that was successfully treated with meloxicam.

CASE REPORT

A 48-year-old man was referred to our hospital for an abnormal chest radiograph with back pain. The left first rib had been partially removed for the treatment of left thoracic outlet syndrome 16 months before the visit. Computed tomography scanning showed an intrathoracic homogenous mass measuring 88 × 34 mm adjacent to the left first to third ribs (Figure 1, A).

The tumor was removed with the adjacent ribs, the transverse processes of thoracic vertebrae 2, the brachial plexus of thoracic vertebrae 1 branch, and part of the left lung through posterior transaxillary thoracotomy. The pathologic findings were consistent with desmoid tumors (Figure 1, B) and immunochemical staining of beta-catenin was positive (Figure 1, C). R0 resection was

The *CTNNB1* gene mutation T41A was correlated with meloxicam sensitivity.

Central Message

The postoperative recurrence of chest wall desmoid tumor was successfully treated with meloxicam. The *CTNNB1* gene mutation T41A, which correlated with meloxicam sensitivity, was detected.

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achieved pathologically. During postoperative follow-up, a mass appeared from the surgical margin and gradually grew in size, suggesting recurrence (Figure 1, D).

The multidisciplinary team determined recurrent disease and prescribed 10 mg meloxicam daily to the patient. The drug was delivered in tablet form. By 3 months after initiation of administration of meloxicam, the tumor had completely disappeared (Figure 1, E). No recurrence has been observed for 4 years since meloxicam treatment. A *CTNNB1* gene mutation analysis was performed, and a T41A (threonine to alanine) mutation, which indicates an intermediate risk (50%) of recurrence and favorable outcome of meloxicam administration,³ was detected (Figure 1, F).

DISCUSSION

Somatic mutations in the *CTNNB1* gene located on the short arm of chromosome 3 have been reported in 64% to 85% of sporadic desmoid tumors.² The mutation generally occurs at codons 41 or 45, with T41A (threonine to alanine), S45F (serine to phenylalanine), or S45P (serine to proline) being the most frequent mutation types. Among them, desmoid tumors with the S45F mutation have higher rates of local recurrence after surgery and greater resistance to meloxicam treatment than tumors with other mutations. Previous reports have shown that meloxicam treatment for

FIGURE 1. Computed tomography (CT) imaging and pathologic findings during the clinical course and the genetic profile of the catenin (cadherin-associated protein) beta 1 (*CTNNB1*) gene of the tumor. A, Preoperative CT scan showed an intrathoracic homogenous mass (arrow). B, The pathologic findings were consistent with desmoid tumors. C, Immunochemical staining of beta-catenin was positive. D, CT scan on postoperative day 46 revealed a mass at the surgical margin, suggestive of recurrence (arrow). E, By 3 months after the administration of meloxicam, the tumor had completely disappeared. F, A *CTNNB1* gene mutation analysis of the tumor revealed a T41A (threonine [Thr] to alanine [Ala]) mutation.

desmoid tumors is effective; the response rate was reported to be 60.6%, but 0% in cases of the S45F mutation.³ This patient showed a T41A mutation, which is reported to carry an intermediate risk of recurrence after surgery (approximately 50%) and was associated with a favorable outcome with the administration of meloxicam. The largest report currently available regarding the *CTNNB1* gene mutation and its correlation with prognosis is from a European group.¹ That group analyzed tumors by beta-catenin immunohistochemistry and direct sequencing. In isolated cultured cells, the proliferating activity was significantly suppressed by meloxicam.⁴ COX-2 blockade plays a role in slowing tumor growth, which suggests that COX-2 inhibitors may exert activity that helps control desmoid tumors.

Other treatment options for desmoid tumors include radiation therapy, chemotherapy (low dose and full dose), tyrosine kinase inhibitors (imatinib and sorafenib), and

antihormone agents. Although retrospective series have shown that a conservative watchful waiting approach results in progression-free survival rates of 50% at 5 years for asymptomatic patients, 20% to 30% of desmoid tumors exhibit spontaneous regression and need subsequent therapies.¹ Regarding radiation therapy, Keus and colleagues⁵ reported that a dose of 56 Gy radiotherapy for desmoid tumors achieved a 3-year local control rate of 81.5%.⁵ Chemotherapy has also been applied for desmoid tumors, typically the antihormone regimen (methotrexate + vinblastine combination). The response rate to chemotherapy with anthracycline-containing regimens is reportedly 54%.¹

CONCLUSIONS

In our patient, meloxicam was effective for treating the postoperative recurrence of a desmoid tumor arising in the chest wall. The somatic mutation type of the *CTNNB1*

gene may be a good biomarker for predicting the efficacy of meloxicam therapy for desmoid tumors.

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