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SOLITARY PLASMACYTOMA OF BONE AND EXTRAMEDULLARY PLASMACYTOMA

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Among plasma cell disorders, solitary plasmacytoma (solitary-plasmacytoma of bone, SPB and extramedullary plasmacytoma, EMP) is rare as compared with mulitiple myeloma (MM). Furthermore, the relationship between solitary plasmacytoma and MM remains unclear. Between 1960 and 1994, 24 patients with SPB and 20 with EMP were treated. The criteria for diagonosis were: (1) No evidence of other lesions based on clinical and radiologic examinations; (2) Biopsy evidence of a plasma cell neoplasm; (3) Bone marrow biopsy specimen with negative findings (less than 10% plasma cell); (4) No anemia, hypercalcemia or renal involvement. The average follow-up period was 112 months (from 6 to 360 months). Fifty-four percent of patients with SPB and 40% of patients with EMP developed MM, however, there was no significant statistical difference between SPB and EMP (P <0.05). We suggested that solitary plasmacytomas be classified as two types, latent and aggressive. The former was histologically well-differentiated plasmacytomas. The latter was poorly differentiated tumors which easily progress to MM. The treatment of choice is wide excision or thorough curettage, by cryogenic necrosis with liquid nitrogen or cautery of the bony wall with phenol and the cavity filled with bone grafts or cement. All patients with apparently isolated plasmacytoma should be given if the tumor turns out to be poorly differentiated, in order to delay their progression to MM.

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Multiple myeloma (MM) is common, while solitary plasmacytoma of bone (SPE) and extramedullary plasmacytoma (EMP) is rare.[1-10] From 1960 to 1994, 24 patients with SPB including 5 reported[2] and 20 patients with EMP were treated at this hospital. The results from six to three hundred and sixty months of follow-up showed these results that some patients were alive for long periods, some had local recurrence or new solitary lesions at distant sites; some progressed to MM. The development and change of 44 cases in this study presents the complexity of SPB and EMP. It reports as follows.

CLINICAL MATERIALS

Criteria for Diagnosis

The 44 cases in this study were up to the following criteria for diagnosis: (1) No evidence of other lesions based on clinical and radiologic examinations; (2) Biopsy evidence of a plasma cell neoplasm; (3) Bone marrow biopsy specimen with negative findings (less than 10% plasma cell); and (4) No anemia, hypercalcemia or renal involvement.

General Data

There were 18 males and 6 females in the patients with SPB, rangig in age from 25 to 59 years with an average of 43.6 years, while 16 males and 4 females in the patients with EMP, aged 22 to 78 years with an average of 59.2 years. In both groups males were more than females and the patients with EMP were older than those with SPB.

The location of the Lesion

In the SPB group, the extremity and the anial skeleton were fifty-fifty. There were 4 cases in the vertebral (cervicale 1, thoracicae 2, lumbale 1), 4 in the collor bone, 3 in the frontable humerus and rib respectively, 2 in the femoris and tibia respectively and 1 in the sternum, scapula and ossacranii respectively. In the EMP group, most EMP occurred in the head and the neck: 7 cases in the cavitas nasi, 4 in the laryngopharynx, 2 in the fossa poplitea and enbraspinal epidural respectively and 1 in the lacrmal mons, clavicula supraspinata, mamma, thoracic wall, fossa axillary respectively.

The Differentiation of Plasmacytoma Cells

The plasmacytoma cells could be divided into well - differentiated and poorly -differentiated according to its differentiation degree. The well-differentiated type was difined latent and the poorly-differentiated type aggressive. Nineteen cases belonged to the latent type (SPB 8, EMP 11), in which plasmacytoma cells well-differentiated: mature plasma cells with round or oval nuclei, well-distributed and abundant cytoplasm. Twenty-five cases belonged to the aggresive type (SPB 16, EMP 9), in which microscopic expamination showed poorly-differentiated plasmacytoma cells with aniocytosis, nuclear irregularity, multinucleation and pleomorphism.

FCM

The nuclear DNA content of plasmacytoma cells in tissue specimens from 11 cases (SPB 8, EMP 3) were determined by flow cytometry (FCM), the results of which showed 4 cases with DNA diploid and 7 aneuploid.

Treatment

All patients in this study were treated by operation. In SPB group, the lesions in the rib or collar bone were treated by wide excision, all others were treated by thorough curettage. Twelve tumors cavities were treated by devitalization with phenol and 5 with liquid nitrogen, in which 10 tumor cavities were filled with bone grafts and 5 with cement. In EMP group, 8 cases were treated by marginal excision and 12 by curettage. Thirty-four cases (SPB 18, EMP 16) were given radiotherapy after operation, ranging in doses from 40 to 50 Gy. Twenty-five cases (SPB 16, EMP 9) received chemotherapy with melphalan and prednisone ranging in the course of treatment from 6 to 18 months.

RESULTS

The average follow-up period to 44 patients in this study was 112 months

SPB

Thirteen of the 24 SPB cases progressed to MM from 11 to 242 months after operation. Three cases were found to have local recurrance from 6 to 13 months after operation and 3 new solitary lesions at distant sites from 24 to 140 months after operation (Table 1).

Table 1: Follow-up results of 24 SPB cases

Pathologic type	Number of cases	Local recurrance	New solitary lesion	Conversion to MM(%)
Latent	8	2	1	2 (25)
Aggressive	16	1	2	11 (68.8)
Total	24	1	3	13 (54)

EMP

Eight of the 20 EMP cases progressed to MM from 12 to 184 months after operation. Two cases were found to have local recurrance from 10 to 12 months after operation and 1 new solitary lesion at distant site 36 months after opertion (Table 2).

Table 2. Follow-up results of 20 EMP cases

Pathologic type	Number of cases	Local recurrance	New solitary lesion	Conversion to MM(%)
Latent	11	1	0	2 (18)
Aggressive	9	1	1	6 (66.7)
Total	20	2	1	8 (40)

Conversion to MM

The rates of conversion to MM for SPB and EMP were 54% and 40% respectively, The dif-ference of which had no statistical significance ($P>0.05$).

The rates of conversion to MM for SPB latent and SPB aggressive types were 25% and 69% respectively, and their difference had statistical significance ($P<0.05$).

The rates of conversion to MM for EMP latent and EMP aggressive types were 18% and 67% respectively, the difference of which was also statistical significance ($P<0.05$).

The Determination Results of DNA Content in 11 Cases

All 4 cases with conversion to MM and 3 cases with new solitary lesions were aneuploid, while the 4 cases with long survival were diploid. Among 7 cases of DNA aneuploid, 6 cases were aggressive type and 1 case latent type. All 4 cases of DNA diploid were latent type.

DISCUSSION

Solitary plasmacytoma is a rare tumor with monoclonal plasma cell dysplasia, and classified as SPB and EMP. It needs to investigate whether it is a entity or not. Although now it is generally felt that solitary plasmacytoma and MM are two different clinical manifestations.

About the Criteria for Diagnosis

There is a little difference about the criteria for diagnosis of solitary plasmacytoma,[2-10] but on the whole it is : (1) No evidence of the lesions in other sites based on clinical and radiologic examinations; (2) Biopsy evidence of a plasma cell neoplasm; (3) Bone marrow biopsy specimen with negative findings (less than 10% plasma cell); (4) No anemia, hypercalcemia or renal involvement. A few scholars[2-4] added follow-up period, for example, Meyer et al.[3] defined no evidence of conversion based on laboratory and X-ray follow up more than 2 years after diagnosis as a criterion. Some scholars proposed a rigid criterion that no dissemination occur when a patient has been alive for over 12 years and no other lesions in skeleton is found by autopsy.[4] It is difficult to have a period criterion, because both medical literature[4-10] and our materials showed that there were still some cases of progession to MM 2 years, 12 years or even 20 years after diagnosis. Since it is certain that there are differences in the clinical course of the disease, symptom and prognosis between the cases progressing to MM and those whose clinical diagnosis was MM at the beginning, it is advisable to regard solitary plasmacytoma and MM as two different clincal manifestations.

Some Factors about the Progression to MM from Solitary Plasmacytoma

Some literature[5-10] showed that the percentage of progression to MM from solitary plasmacytoma was very high, about 60% in SPB and 40% EMP. These percentages were different because of different follow-up periods. It is an interesting problem that which solitary plasmacytoma may easily progress to MM. Some studies suggested that the existance of monoclonal component in serum protein electrophoresis after surgery or/and radiotherapy probably indicate subclinical dissemination of MM. However Meis, et al. did not think that the existance of

monoclonal component indicated dissemination of MM. They thought the poorly differentiated plasmacytoma cytology (of the neclear morphology) might be an excellent indicator. This study supported this view point. In this study, the percentages of progression to MM were 25% and 69% in latent and aggressive types of SPB respectively, and 18% and 67% in latent and aggressive types of EMP respectively, and the difference between the latent and the aggressive type had statistical significance ($P<0.05$). About the level of DNA ploid, although only 11 cases were analyzed in this study, the number of which was not enough to make a statistical analysis. We observed that all 4 cases of conversion to MM and 3 cases of new solitary lesions at distant sites were aneuploid, while the 4 cases with long survival were diploid. It is worth to further investigate whether or not the 3 cases of new solitary lesions at distant sites and DNA aneulploid might progress to MM. Further studies are needed to show whether or not the analysis of DNA ploid level can indicate that which solitary plasmacytoma may progress to MM.

Local Recurrance

About local recurrance, we thought this was associated with the way of operation, the addition of cryogenic necrosis and the adoption of postoperative radiotherapy control. Local recurrance did not necessarily mean progression to MM. In the study, all 5 case of local recurrance were treated by curettage, some of which were not treated by cryogenic necrosis and some did not receive local radiotherapy after operation. No local recurrance was found in those treated by marginal or wide excision. After a second treatment to all the 5 cases of local recurrance, no recurrance or conversion to MM was found after 56-98 months of follow up. Importance should be attached to those patients with new lesion at distance sites that whether they might progress to MM. Such 4 cases in this study were under close observation.

Treatment

Vigorous measures should be taken in treating sdolitary plasmacytoma, since up to now it is difficult to predict when these patients may progress to MM; furthermore, most patients, after local treatment, can live in good health for many years or even for their whole life. Some literature reported[6,7,9,10] radiotherapy in large dosage could effectively control local lesion, but we still stood for en bloc excision. For some parts, en bloc resection should be adopted if no significant functional influence is involved, such as the rib, clavicula and soft tissue lesion in some parts. For some other parts. if en bloc resection is difficult, curettage may be used, together with cryogenic devitalization by chemical method (phenol. zinic chloride) or physical method (liquid nitrogen freezing) or with clavity filled with bone graft or cement. Internal fixation may also be used when necessary or when the patient has pathological fracture. Local radiotherapy is needed after operation, with doses ranging from 40 to 55 Gy, so as to receive better local control. For the aggressive type, we suggested chemotherapy be given in order to delay their progression to MM.

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