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Case Report

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A case report: Reconstruction of the forearm support and function after resection of rare proximal radius malignant chondrosarcoma (grade III) bone tumor

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Abstract

Chondrosarcoma is one of the common malignant bone tumors and is characterized by thin tumors. The cells produce tumor cartilage. It occurs usually 3rd decade of life, affected more men than women. Proximal radius bone affected by chondrosarcoma and become malignant is rare. Surgical treatments are mainly recommended for most types of chondrosarcoma. However, their treatment clinically and surgically is controversial.

Keywords: Reconstruction, Rare proximal radius, Malignant chondrosarcoma, Bone tumor.

INTRODUCTION

The cells produce tumor cartilage. It can occur at any age, common in adults, more men than women [1]. Occur Chondrosarcoma in the proximal middle part of radius is rare, after extensive radius resection Forearm function reconstruction methods are also rarely reported. Postoperative bone defects often require reconstruction of tumor prosthesis or bone graft [2]. Our department of spine orthopedics admitted a patient with chondrosarcoma of the proximal radius bone. After the general resection, the distal ulna and the radius are used for the forearm support skeleton. Reconstruction, follow-up for 2 years, the bones of the reconstructed site healed well, and the function of the forearm basically unrestricted, no tumor recurrence.

CASE REPORT

Clinical information

First, general information:

36 years old male patient, due to "the right forearm pain is uncomfortable for 21 months and admitted to the hospital afterwards. The patient had no obvious cause of proximal right forearm swelling 21 months ago. It is sore and uncomfortable, and the pain is aggravated during exercise. 2 months ago, the patient complained to the right elbow joint pain. The outside of the joint can feel mass by touch, gradually it was increasing, and the pain is obviously aggravated. Local hospital X-ray showed "cystic expansive bone destruction in the proximal radius", the pain was more serious later, and he visited our hospital.

Second, preoperative examination:

1. Physical examination done of the right swollen forearm according to anterior lateral side and the local part is visible. 3 cm × 4 cm sizes, hard mass, unclear boundary, poor mobility, local tenderness, Sputum pain is positive. Right upper extremity limb distal blood supply and skin acupuncture normal, right elbow flexion of the joint was slightly restricted, and the function of straightening, pronation and supination was normal.

2. Laboratory examination: 1 blood routine- white blood cell count was 4.86 × 109 / L, medium granulocyte count was 0.06×109/L, and the platelet count was 223.0×109/L. Protein content is 156.0 g / L; 2 biochemical complete set- erythrocyte sedimentation rate (ESR), C The reaction protein (CRP) and procalcitonin were

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Differential Diagnosis

normal; 3 tumor marker examination- measurements of prostate specific antigen, carbohydrate antigen CA19-9, CA12-5, alpha-fetoprotein (AFP), all the tests were normal.

3. Imaging examination: 1 right ulnar radius and lateral side X-ray showed right radius cystic distension of bone in the proximal midsection, bone destruction, almost involving the full length of the radius, considering the bony exposure to disease; 2 CT and 3D reconstruction of right ulnar radius showed cortical thickening, bone density of the medullary cavity was abnormal, long range of lesions, considering the possibility of osteomyelitis; 3 right elbow joint MRI scan showed that the normal shape of the upper radius was disappeared and there were enlargement. Abnormal signals in the bone marrow cavity with edema and thickening of the surrounding periosteum and right radius adjacent, near soft tissue swelling should be differentiated from eosinophilic granuloma and Ewing's sarcoma; 4 whole bodies CT scan showed abnormal nuclide concentration in the proximal and middle portion of radius, considering tumor lesions.

Figure 1: Preoperative imaging data a: X-ray showed that the proximal and middle end of the right radius was visible, with changes of faecal expansive bone destruction, thickened bone, and the bone was worm-like change; b: CT+ three-dimensional reconstruction showed the radial bone Cortical thickening, abnormal bone marrow density, abnormal calcification; c: MRI showed obvious enlargement of the upper part of the radius segment, abnormal bone marrow signal, periosteal edema, thickening, swelling of adjacent soft tissue; d: whole body Bone tomography scan shows concentration of nuclides in the proximal and middle part of radius.

Third, pathological examination and diagnosis:

After admission, CT-guided core trocar puncture biopsy was performed. Disease physical examination: graying and white bone tissue with a volume of 0.3 cm × 0.3 cm ×0.3 cm was observed by the naked eye. Pathological diagnosis: the right radius was as a homogeneous powder stain with cartilaginous visible. Cells were considered chondrosarcoma.

Fourth, surgical treatment and reconstruction of forearm support function:

Under general anaesthesia, the right proximal radius bone tumor was extensively excised and the ulna was far away. Internal fixation with titanium plate screws for Segmental osteotomy, proximal ulna and distal radius. Intraoperative right radial bone tumor is cantered, and a posterolateral longitudinal incision was made. The exposure includes the proximal radius of soft tissue tumor mass was free from the tumor boundary. According to the preoperative MRI intramedullary tumor invasion range (the tumor length is 15 cm), so the small radius head was exposed to a distance of 18 cm, which is 3 cm outside the tumor. Cut the radius internally and remove the proximal and middle portion segment of the radius containing the tumor about 3.6 cm. After the operation, the bone tissue was removed and sent to the pathology examination. Reconstruction Forearm support function: rinse the wound with distilled water, replace instruments and gloves, expose the ulna, truncate the ulna at the level of the radial osteotomy, and closes the ulna and remains radial fracture ends are remnant, the wrist joint is slightly rotated, and the titanium plate screw is satisfactory fit after the alignment and joint was fixed, pay attention to the pressure at the broken end, and reconstructed the forearm support skeleton. Close the incision. The forearm sling was used to fix the affected location in the functional position (Fig. 2).

Fifth, postoperative pathological examination:

Bone tissue was removed from the radius with a length of 18 cm and the diameter was 4 cm, gray and whitish tumor tissue can be seen in the medullary cavity with length 15 cm and tumor tissue quality plasm brittle, the naked eye invades the soft tissue around the bone. Microscopically: chondrocytes and cartilage matrix are composed. It is lobulated and invasive. Pathological diagnosis: right radial chondrosarcoma (grade III); No tumor tissue was seen at the margin.

Six, postoperative radiotherapy and chemotherapy and follow-up:

The patient's postoperative pain was relieved, the length of both limbs was equal, and the forearm shape was normal. 1 month after surgery, 3 cycles of pirarubicin, ifosfamide, recombinant human vascular endothelial inhibition Chemotherapy were performed. Also radiation therapy performed at the same time with proximal boundary of the level of the olecranon, and the distal boundary of the distal radius, the medial border is the ulnar cortex and the lateral border is the muscle layer. Prescription dose: 95%PTV64Gy/2Gy/32f, 32 times radiotherapy were completed; the fourth cycle of chemotherapy was performed 3 months after surgery. Postoperative X-ray films showed bone grafting fused nicely and reconstructed bone healed up followed up to 3 months after surgery. Reconstruction of bone end fused completely 2 years after surgery (figure 3). During the follow-up 2 years after surgery the appearance of the right forearm was normal, and there was no dislocation on elbow joint and wrist joint, no tumor recurrence was observed. Checked forearm motor function, Draw elbow flexion 120°, straightening 0°; forearm anterior rotation 45°, posterior rotation 80°; dorsal extension of wrist 10°, palm flexion 40°; wrist joint adducted 10° and abduction 20° (Fig. 4). Elbow joint Mayo score is excellent, the wrist joint Mayo scored well. Only forearm rotation and wrist extension and palm the flexion function is mildly limited and which does not affect daily life.

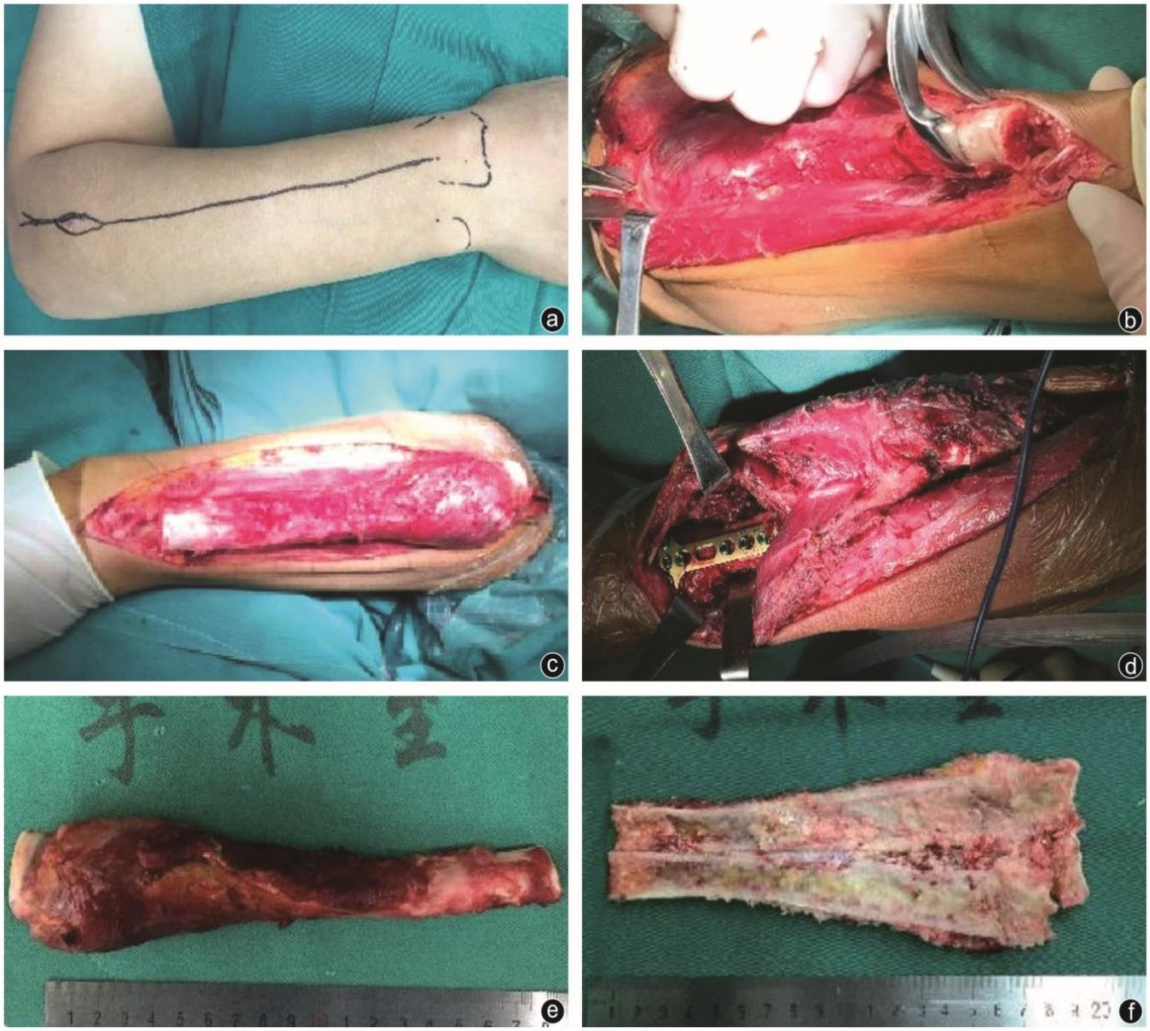

Figure 2: Surgical picture, a: the appearance of the incision and lesion location; b: the radius was exposed at a distance of 18 cm from the radial head, and the radius was cut within 3 cm outside of the tumor; c:remove the proximal middle radius containing where was swelling ; d: revealing the ulna and cutting the ulna at the level of the radial osteotomy, docking the proximal ulnar end with the remaining radial fracture end, titanium plate, screw fixation, reconstruction of the forearm support skeleton; e, f: resection , Post-tumor tissue appearance and dissection.

DISCUSSION

Chondrosarcoma is the formation of cartilage-like tissue by tumor cells, which can occur in any bone, but commonly in long bones. The tumor reported in this article is extremely rare clinically. Malignant chondrosarcomas are pathologically classified as classical chondrosarcoma by pathology (grade I~III). Low-grade malignant chondrosarcoma has a good overall prognosis and is highly invasive; chondrosarcoma has a high metastatic rate and is not sensitive to chemotherapy or radiotherapy [3]. Wide resection is the primary choice in treatment. If intraoperative it is not possible to meet the boundary requirements for extended resection, and it is often necessary to perform radiotherapy in the surgical field [4]. This The patient's tumor pathology grade is III, and the clinical stage is stage II A. (G1T1M0), extended tumor resection plus postoperative radiotherapy and chemotherapy, postoperative No tumor recurrence was seen in 2 years follow-up, and the treatment effect was good. After extensive resection of bone tumors requires a lot of bone reconstruction, and the function of elbow and wrist joints should be guaranteed as much as possible. At present, the reconstruction method mainly has its own body bone graft, allogeneic bone graft and artificial prosthesis replacement, but most of them are used for bone reconstruction after radial-distal tumor resection [5]. Chondrosarcoma at the proximal midpoint of the radius are rare, and reconstruction methods are rarely reported. Song *et al* [6] reported the Reconstruction method of 1 case of resection of proximal radius giant cell tumor, in which polyethylene lining was used as the radial head prosthesis, a pin was inserted into the radial bone marrow cavity as the prosthesis handle, and nylon mesh was covered on the surface to attach the biceps tendon. Zhu *et al* [7] treated a number of patients with proximal radius bone tumor, the autogenous ilium was implanted in the bone defect after surgery, and elastic intramedullary nail were placed in the radial bone cavity. Sakayama *et al* [8] used proximal radius total resection treatment of giant bone cell tumor of the proximal radius, bone cement filled at the defect site and the elbow joint was constructed by floating comb bone. All the above reconstruction plans have achieved some short term effects, but there is lack of strong clinical evidence. In this case, patient's tumor involved the proximal and middle section of the radius, and nearly whole the whole length of bone (only 3.6 cm was left in the distal radius after the resection of the tumor), as the radius bone defect was large, and the prosthesis and bone cement filling cannot be used for reconstruction. The ulna contributes the most to the elbow joint, while radial bone contributes wrist joint. In this case, we choose autologous ulnar osteotomy to reconstruct the forearm bone scaffold with the proximal ulna and distal residual radius, avoiding complex surgical procedures and utilizing the most reliable healing properties of autologous bone, which was the most economical choice. The patient was followed-up two years after surgery. The patient's forearm appearance was excellent, the elbow joint flexion and extension function was normal, and only the dorsal extension and abduction function of the wrist was slightly limited, but to the right hand functional impact was less affected, and the daily living ability was close to normal.

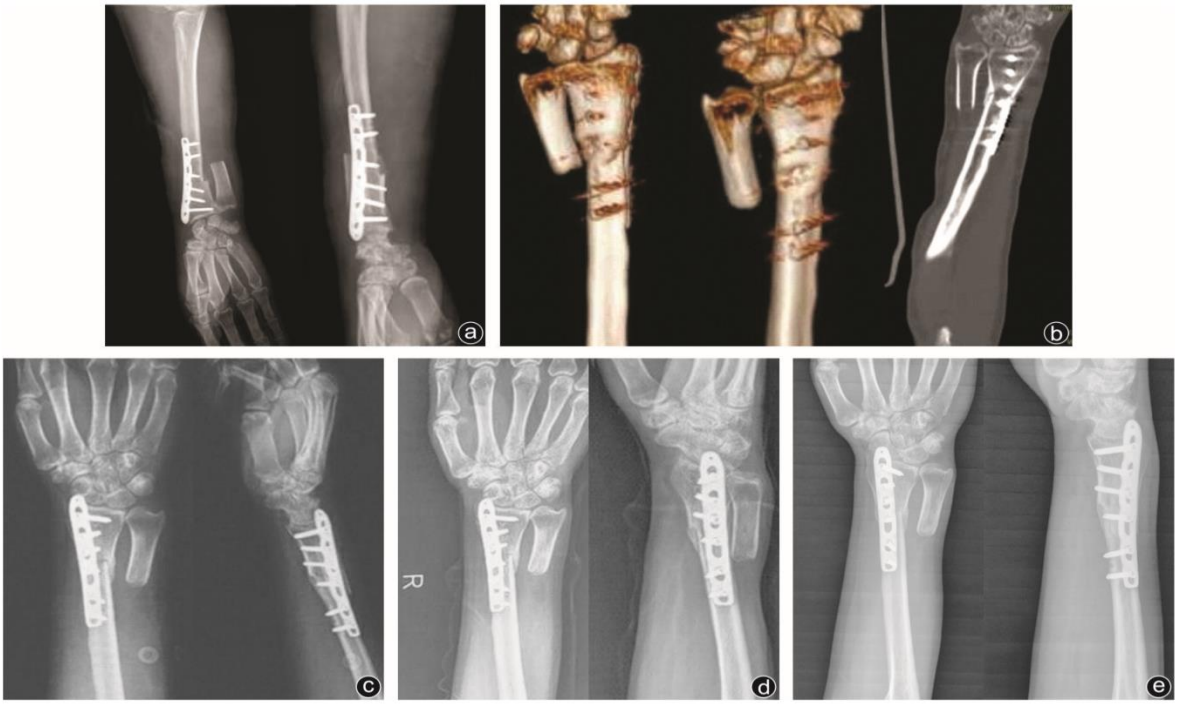

Figure 3: Postoperative imaging data a: Immediately after the operation, the X-ray film showed good alignment of the ulna and the radial end of the bone; b: CT+3D reconstruction showed bone graft reconstruction after 3 months; c: X-ray film showed 3 months after operation Reconstruction of bon fused and healed well, no tumor recurrence was observed; d: 9 months after operation, the reconstructed bone end healed firmly; e: 2 years after surgery, the reconstructed bone end was completely fused, no elbow joint, wrist dislocation, no tumor relapse.

Figure 4: 2-year follow-up of the forearm function test a ~b: elbow joint mobility; c, d: forearm rotation function; e~ h: wrist joint mobility.

CONCLUSION

It is an important method to reconstruct the forearm support structure and function by fusion with the metallic implant of the proximal, middle ulna and the distal radius. It was an excellent alternative treatment of such malignant chondrosarcoma grade III tumor.

Conflicts of interest

There are no conflicts of interest.

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Not applicable.

Authors' contributions

JD Shi and SA Jami involved in treatment of the patient. SA Jami involved in drafting and editing the manuscript. Both authors read and approved the final manuscript.

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