



NAVIGATION ASSISTED GEOGRAPHIC RESECTION AND ALLOGRAFT RECONSTRUCTION FOR EXTREMITY BONE TUMORS

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SUMMARY

Objectives: The aim of this study is to evaluate the precision of navigation assisted surgical geographic resection and allograft reconstructions for bone tumors, facilitate resection and improve the allograft matching rate and reduce the gap. **Methods:** We retrospectively analyzed 19 consecutive extremities primary bone tumors, including distal femur 13, proximal tibia 5 and 1 distal tibia. The mean and median ages were 35.2 and 31 years respectively. Mostly were parosteal osteosarcoma, periosteal osteosarcoma, and periosteal chondrosarcoma. Import the patient's data into the Stryker navigation system for preoperative bone cutting design, geographic resection line according to the tumor morphology. With the intraoperative data and preoperative image fusion, geographic line could be real-time guided by navigation system and we could execute accurately and more conveniently in tumor margin, allograft geographic taking out and transplant matching. **Results:** With a mean and median follow-up of 40 and 38 months respectively, 1 patients developed LR (1/19, 5.3%), 2 metastasis and dead (2/19, 10.5%). All patients received satisfactory margin resection and accurate allograft matching. All transplanted allograft mean longitudinal length was 83.7 mm, the mean diameter was 40.2 mm, compare to the preoperative design for the tumor resection longitudinal length 83.1mm and diameter 40.2mm, it has good matching rate and no significant difference ($P > 0.05$). Comparison of the mean gap space for free-hand group (3.3 ± 2.0 mm) and navigation group (1.8 ± 1.2 mm) between the host bone and allograft, it has significant difference ($P = 0.024$). The mean and median allograft healing time was 10 and 9.5 months. The mean of functional scoring with MSTs for this group were $97.2 \pm 4.8\%$. **Conclusions:** (1) Computer navigation assisted accurate tumor resection and safe margin. (2) Navigation guided precise excision and reconstruction, facilitate bone healing and functional recovery. (3) Compared to the limitations of free hand, navigation technique is good choice for geographic resection and allograft reconstruction.