Prediction of progression-free survival in pancreatic neuroendocrine tumours after curative surgery using MR imaging features

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Aims and objectives

Our purpose was to investigate the MR features that could lead to recurrence after radical surgery for pancreatic neuroendocrine tumors (PNETs).

Methods and materials

Sixty patients with PNETs undergoing radical surgery from 2009 to 2018 were recruited into this retrospective study. MR imaging features#pancreatic atrophy# tumor shape, tumor size and lymph node metastasis#, tumor grading of WHO 2017, and intravascular tumor embolus on samples were assessed by Cox proportional hazard ratio regression to confirm predictors of progression-free survival (PFS). The cumulative recurrence rate was calculated by the Kaplan-Meier method and the log-rank test was performed to compare the different PFS.

Results

Recurrence of PNETs was found in 10 of 60 patients during the follow-up period, and the overall estimated 3-year PFS was 78.7%. Pancreatic Atrophy (P=0.002) and irregular shape (P = 0.013) were independently associated with poor PFS. The PFS of pancreatic atrophy group was significantly lower than the non-pancreatic atrophy group when the age of patients#53(P=0.004). The PFS of irregular shape was significantly lower than round shape(P=0.004). The PFS of G1 group was better than the G3 group(P=0.011). Moreover, a binary logistic-regression model revealed that intravascular tumor embolus (P = 0.045) was independently associated with pancreatic atrophy.

Images for this section:

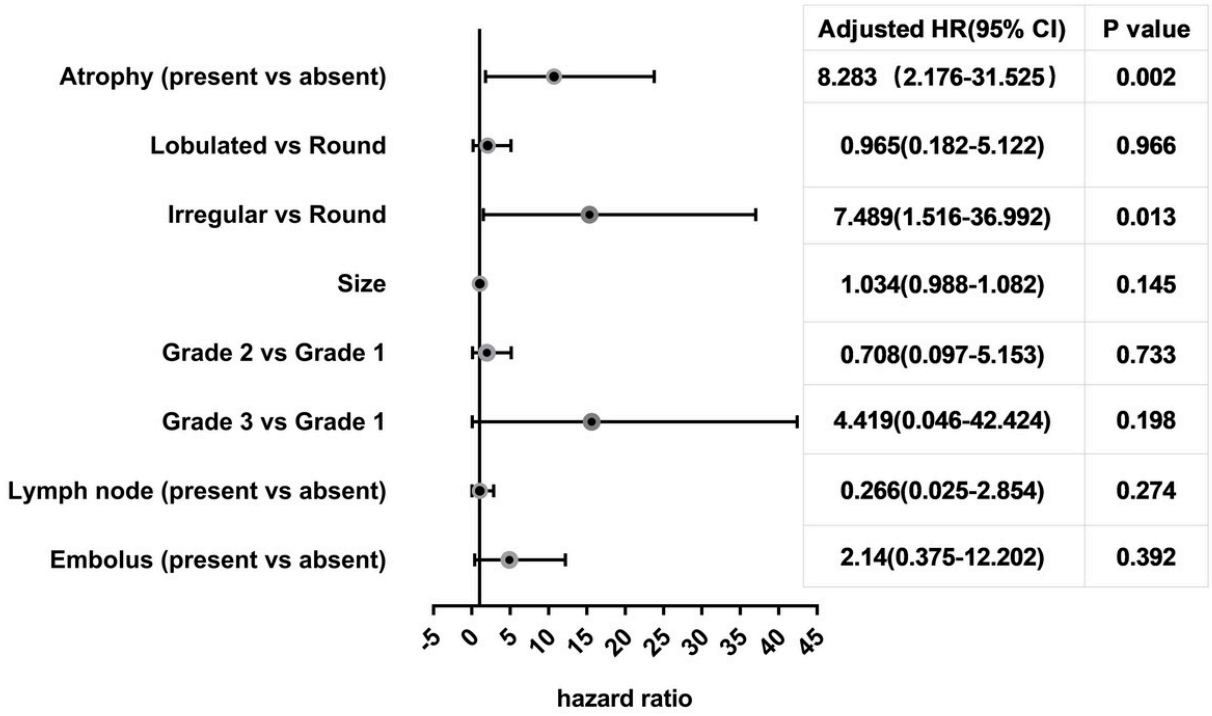

Fig. 1: Multiple Cox survival analysis of the predictors for PFS of PNETs

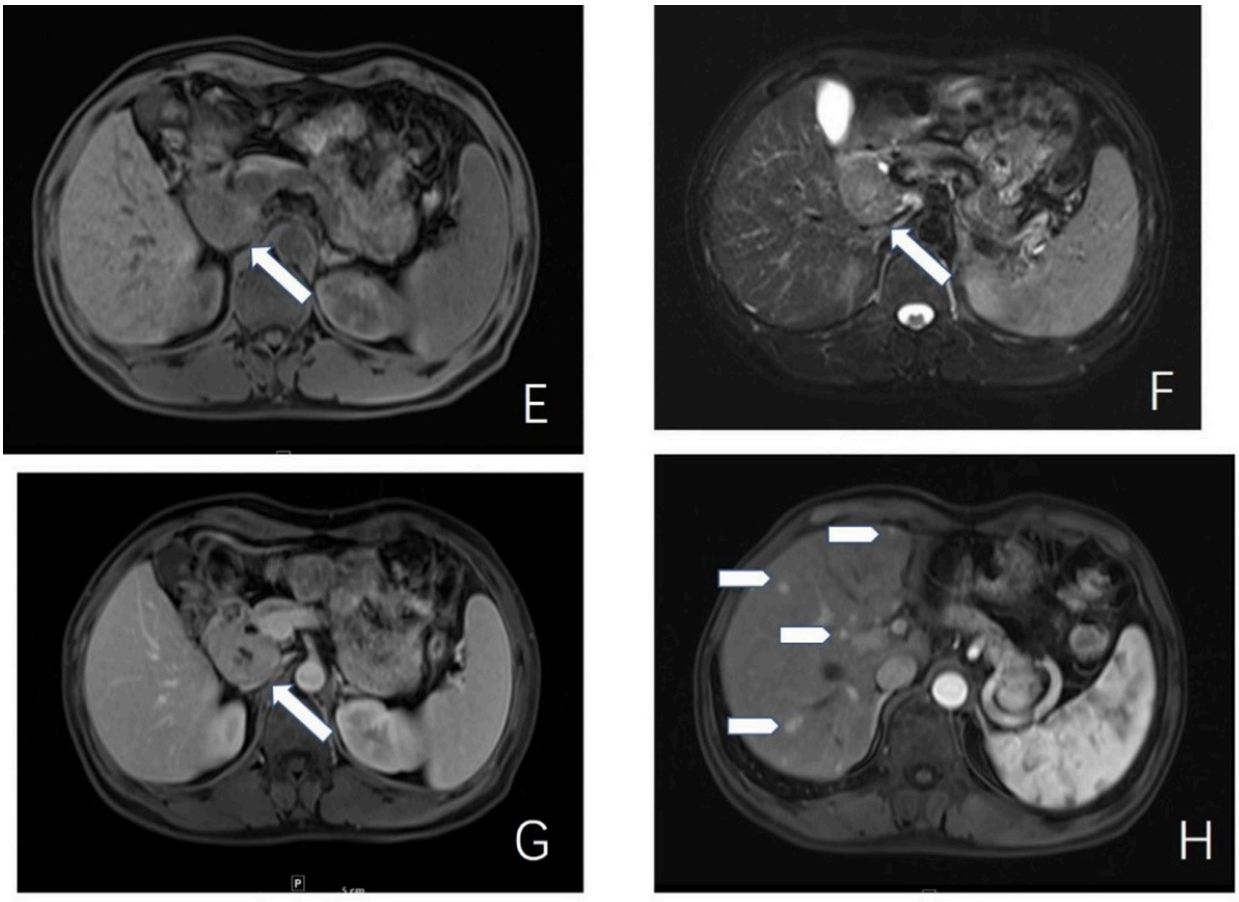

Fig. 2: Distant liver recurrence in a 54-year-old man with PNETs of irregular shape after radical surgery. T1WI FS (E), T2WI FS (F) and Delayed phase (G) on MR images show a G2(Ki-67 index = 5) PNETs (white arrow) with the irregular shape in pancreatic head. (H) Arterial phase taken 84 months after Child's operation for the pancreatic head PNETs shows multiple metastases (white arrowhead) in the liver.

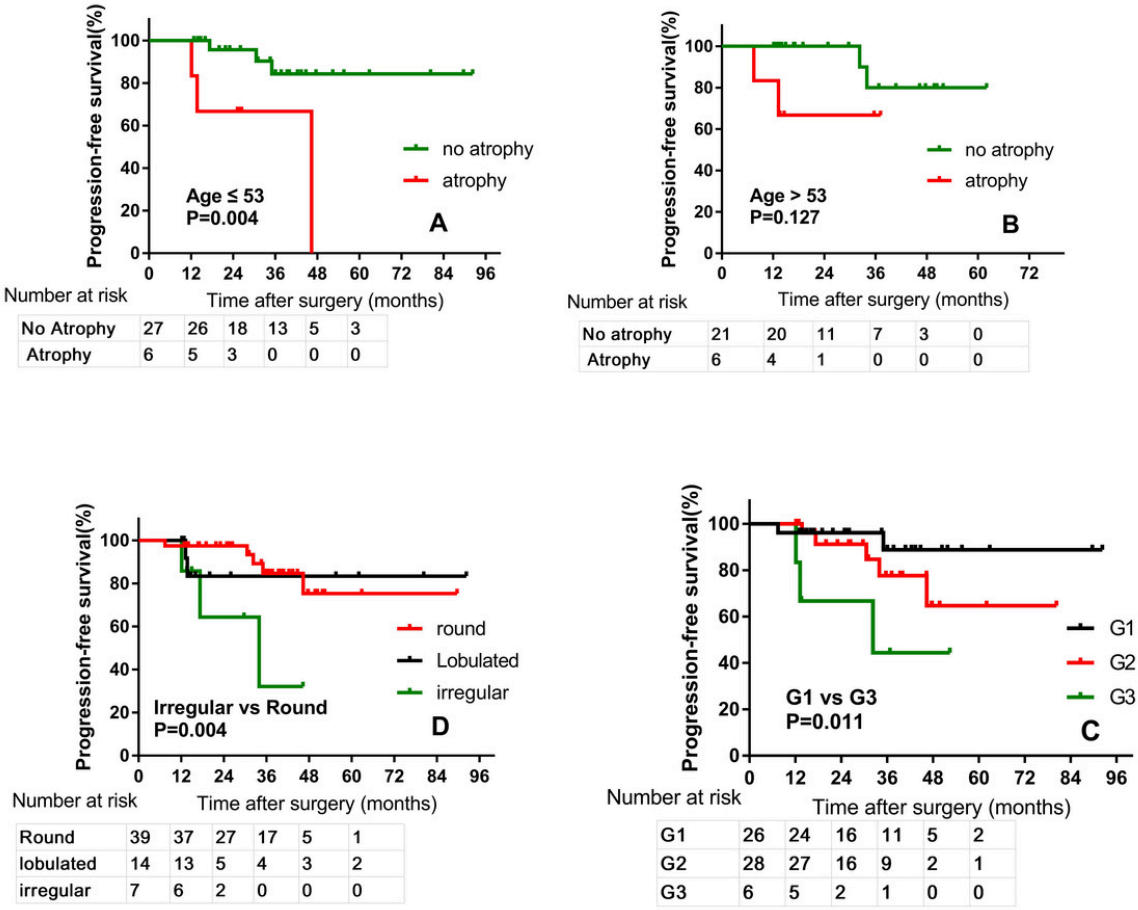

Fig. 3: Kaplan-Meier curves of PFS for pancreatic atrophy, tumor shape and grading. Comparisons between pancreatic atrophy group and non-pancreatic atrophy group with age #53(A) and age >5(B); (C) Comparison among round, lobulated and irregular tumor shape; (D) Comparison among tumor Grade1, Grade 2 and Grade 3.

Conclusion

The irregular tumor contours and pancreatic atrophy may be MRI predictors of poor prognosis in PNETs after curative surgery.

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