**INTRODUCTION**

Routine drainage had been proven as unnecessary or detrimental for many procedures in abdominal surgery, however, clinical evidences for abandoning prophylactic drainage after pancreaticoduodenectomy were conflicting. Risk-stratified strategy seems more promising.

**OBJECTIVE**

To formulate and validate risk prediction models for postoperative pancreatic fistula (POPF) after pancreaticoduodenectomy, and to propose a novel strategy for placement/early-removal of prophylactic drainage based on individualized risk.

**METHODS**

POPF was defined according to ISGPS 2016-updates. Potential variables might be related to POPF were collected. Independent predictors were identified with multivariate logistic regression model and put together to build two risk-prediction models at different time-points (intraoperatively/POD3). Internal validations were carried out. Cut-off values were set for the predicted risks to guide decision-making for omitting prophylactic drainage, or its early-removal. Effectiveness and safety of the strategy were evaluated by simulative application.

**RESULTS**

477 consecutive patients who underwent pancreaticoduodenectomy were included (2012-2014). Overall POPF rate was 14.0%. Preoperative albumin, duct diameter, gland consistency, intraoperative blood loss were independent predictors for POPF in model1 (477 patients), while drainage amylase level and blood neutrophil count on POD3 were additionally included in model2 (204 patients). AUC of ROC analyses for two prediction models were 0.717 and 0.860, while Callery model had an AUC of 0.679. When risk<5%/10% were set as cut-off values for no-drainage/early-removal in two models, the actual sensitivity, specificity, PPV and NPV of our two-step strategy were: 0.806, 0.711, 0.333, 0.953 respectively.

**CONCLUSION**

POPF can be well predicted based on our models, and risk-stratified strategy for drainage management worth further validation in prospective trials.