

Changes of Diabetic Status in Patients Undergoing Pancreatic Surgery

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Context Pancreatic surgery can be related to new onset diabetes, but also with diabetes remission. Postoperative reversion of diabetes has been attributed to the removal of pancreatic cancer.

Objective To evaluate changes of diabetic status and the determinants of diabetes reversion after pancreatic surgery.

Methods Prospective observational study. Patients candidate to pancreatic surgery, admitted from Jan 2008 to Oct 2012, were evaluated. Clinical variables were recorded and blood biochemistry (including fasting blood glucose, insulin and C-peptide) were evaluated pre- and post-operatively with regular follow-up. Patients were defined as diabetic if fasting plasma glucose was ≥ 126 mg/dL or HbA_{1c} was $\geq 6.5\%$ or if taking diabetes medications.

Results Study group included 624 patients. 523 underwent pancreatectomy (264 pancreaticoduodenectomy (PD), 174 distal, 66 total, 17 enucleation, 2 segmental), 78 had palliative surgical interventions and 23 were discharged without surgery. Among 297 non-diabetic patients who underwent partial pancreatectomy, 44 (14.8%) developed diabetes postoperatively (median of 30 days). Univariate analysis showed higher HbA_{1c} level, higher fasting glycemia, higher BMI, pancreatic cancer and distal pancreatectomy strongly associated with new onset diabetes. Multivariate analysis confirmed fasting glycemia (OR=1.63, 95% CI: 1.06-2.49; P=0.024), BMI

(OR=1.19, 95% CI: 1.09-1.30; P<0.0001) and cancer (OR=2.855, 95% CI: 1.19-6.84; P=0.019) as variables independently associated with post surgical new onset diabetes. Among 160 diabetic patients who underwent partial pancreatectomy, 29 (18.1%) presented reverted diabetes postoperatively (median of 16 days). A similar behavior was seen in patients who did not undergo pancreatectomy. Among 47 diabetic patients who underwent palliative surgery, 8 (17.0%) presented reverted diabetes postoperatively (median of 7 days). Surgical procedures bypassing the duodenum (both PD and gastro-jejunostomy) were associated with reversion in univariate Cox regression analysis. Multivariate analysis confirmed surgical procedures bypassing the duodenum (OR=2.36, 95% CI: 1.02-5.42; P=0.44), but not cancer removal, to be independently associated with diabetes reversion. **Conclusions** Diabetes changes are frequent after pancreatic surgery, with a 14.8% rate of new onset diabetes and 18.1% of diabetes reversion. Reversion occurred within a few days after surgery before significant weight loss takes place, and surgical procedures which bypass duodenum appeared major determinants. This suggests that, as for bariatric surgery, gastrointestinal anatomic changes more than cancer removal may play a relevant role in remission of diabetes.