



## Novel concepts for surgical treatment of pancreatic cancer

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The surgical treatment of pancreatic cancer has seen sweeping innovations during recent decades, with game-changing developments in surgical techniques as well as introduction of novel and more effective combination chemotherapy regimens. Together, these innovations have resulted in an expansion of surgical indications. While the minimally invasive technique with both traditional laparoscopic and the robotic approach has become an accepted standard procedure for distal pancreatectomy, the evidence for minimally invasive pancreatic head resection is still sparse, especially in terms of oncological outcomes in patients with pancreatic cancer. The current literature and future perspectives on minimally invasive approaches in pancreatic cancer surgery are summarized in the article by Deichmann et al. In open surgery, unique technical advances have been made with the aim of achieving surgical radicality in patients with locally advanced initially irresectable tumors after neoadjuvant treatment. Refinements in surgical techniques such as the so-called arterial divestment enable complete tumor clearance in pancreatic cancer with encasement of the visceral arteries after neoadjuvant treatment, while avoiding hazardous arterial resections in the majority of patients with a good response to neoadjuvant therapy. Anatomical landmarks have been defined to guide radical resections during “triangle resection” for pancreatic head and body cancer, and during “radical antegrade modular pancreatosplenectomy” for cancer of the pancreatic body or tail. Details of the latest innovations in surgical techniques and principles of intraoperative

strategies to achieve R0 resection in pancreatic cancer and to avoid tumor recurrence are described in the article by Hank et al. Last but not least, the best surgical procedure does not result in optimal outcomes without the addition of effective oncological treatments. In recent years, survival after pancreatic cancer surgery has been significantly prolonged by the introduction of effective polychemotherapy protocols in addition to surgery. Modern neoadjuvant chemotherapy has increased the pool of candidates for surgery by downsizing primary tumors and by even erasing oligometastases. Beyond that, selecting the best chemotherapy regimen in a personalized tumor-specific fashion such as genome-targeted and genome-informed therapy will offer the chance for cure after surgical resection. The goal of cure might also be achieved by selecting patients especially sensitive to current chemotherapy regimens based on tumor biology associated with treatment-specific transcriptional signatures. Neoptolemos et al. give fascinating insights into personalized treatment options in pancreatic cancer and ongoing investigations in this field.

Even though pancreatic cancer remains one of the most aggressive and challenging tumor entities, novel concepts for surgical and multidisciplinary treatment of pancreatic cancer have achieved considerable improvements in patients' survival and quality of life. Nevertheless, we are still far from satisfied with the results of surgical treatment in pancreatic cancer. Improvement of oncological and patient-reported outcomes of pancreatic cancer surgery should be the foremost aim of our future studies.

**Conflict of interest** U. Klaiber and O. Strobel declare that they have no competing interests.

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