

9. Summary

Muscle-invasive bladder cancer (MIBC) is a malignancy characterized by rapid progression and poor prognosis, which necessitates the use of multimodal treatment strategies combining systemic therapy and radical surgery. Neoadjuvant chemotherapy (NAC), most commonly cisplatin-based, is an established component of guideline-recommended management for eligible patients. It has been shown to improve overall survival, promote tumor downstaging and increase the likelihood of achieving complete pathological response. Despite these advantages, its real influence on perioperative morbidity and postoperative outcomes remains an important topic of clinical debate, and its use in everyday practice is still lower than recommended. This dissertation presents a retrospective analysis of 450 patients treated with radical cystectomy performed using laparoscopic or robot-assisted laparoscopic techniques at two high-volume urological centers. The studied population included individuals who received NAC and those who met the eligibility criteria for NAC but were operated on without prior systemic therapy. To minimize potential confounding factors and obtain reliable comparisons, a case–control matching method was employed. This allowed the evaluation of NAC effects in a clinically relevant and appropriately controlled setting. The study aimed to provide a comprehensive assessment of NAC’s impact on perioperative outcomes, including operative time, blood loss, length of hospitalization, the incidence of complications classified according to the Clavien-Dindo scale, and the necessity of reoperation. In addition, oncological outcomes such as pathological staging after surgery, the rate of complete pathological response, the presence of positive surgical margins, and long-term survival rates (overall survival and cancer-specific survival) were analyzed. The results demonstrated that NAC was associated with a higher frequency of reoperations and a higher rate of complications defined as strictly surgical in nature. However, no significant differences were observed between the NAC and non-NAC groups regarding major complications (Clavien 3–5), intestinal complications, ICU admissions or perioperative mortality. Likewise, perioperative parameters such as blood loss and operative time did not show clinically relevant disparities. These findings indicate that although NAC may increase the number of postoperative surgical events requiring intervention, it does not significantly raise the risk of severe or life-threatening complications. With respect to pathological outcomes, NAC produced clear benefits. Patients treated with NAC exhibited substantially lower postoperative pathological tumor stages and

a high rate of complete pathological response (pT0 of 32.3%). Furthermore, the frequency of positive surgical margins was considerably lower in patients after NAC. These findings support NAC as an effective modality capable of reducing tumor burden prior to surgery and improving the likelihood of achieving complete eradication of disease. Long-term follow-up showed that 2-year overall survival was significantly better in the NAC group, although this advantage decreased over time and was no longer apparent at 5 years. Cancer-specific survival was similar between groups, suggesting that factors other than NAC may influence long-term outcomes. Importantly, patients who received NAC and achieved negative surgical margins had the most favorable survival results, whereas those with positive margins despite NAC exhibited the poorest prognosis. These observations highlight the prognostic interplay between NAC response and surgical radicality. Overall, the dissertation offers a detailed and clinically meaningful assessment of NAC in MIBC management based solely on real-world data from high-volume surgical centers. The results reinforce the oncological value of NAC, particularly regarding the increased probability of tumor downstaging and pathological response, while simultaneously identifying areas requiring further improvement, such as perioperative care and refinement of patient selection. Although NAC may increase certain surgical complication rates, it does not substantially worsen the profile of severe complications. The findings confirm that NAC remains a central and effective component of multimodal therapy for muscle-invasive bladder cancer and can significantly contribute to improved outcomes when used appropriately and in conjunction with optimal surgical management.