

Original article

Investigating the effect of treatment at high-volume hospitals on overall survival following cytoreductive nephrectomy

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Abstract

Purpose: Data revealed the benefit of high-volume care in many complex disease processes. Among patients undergoing nephrectomy, those receiving cytoreductive nephrectomy (CN) for metastatic renal cell cancer (mRCC) constitute a unique subset. They often have a greater medical and surgical complexity. Against this backdrop, we sought to investigate the effect of hospital volume on overall survival among patients undergoing CN for mRCC.

Material and methods: We identified 11,089 patients who received CN for mRCC in the National Cancer Database from 1998 to 2012. We ranked hospitals based on annual CN volume. Patients who received surgery in hospitals in the top vs. bottom deciles were compared. Inverse Probability of Treatment Weighting (IPTW)-adjusted Kaplan-Meier and Cox regression analyses were used to compare the primary endpoint of overall survival between balanced cohorts of patients. Secondary endpoints were 30-day mortality, 30-day readmissions, and receipt of subsequent systemic therapy.

Results: Median follow-up was 60.39 months (interquartile range [IQR] 35.09–95.95). Median overall survival was 17.61 months (IQR 7.16–44.58). Following propensity score weighting, surgery at a high-volume hospital was associated with a decreased risk of mortality (IPTW-adjusted Cox proportional Hazard Ratio = 0.91; 95% confidence interval: 0.86–0.96). On our IPTW-adjusted Kaplan-Meier analysis, the median survival was 19.94 months (IQR 7.98–50.27) at high-volume hospitals vs. 15.97 months (IQR 6.6–41.56) at low-volume hospitals. With regard to secondary endpoints, the data did not reveal a significant advantage for treatment at a high-volume hospital.

Conclusion: We found a significant association between receipt of CN at high-volume hospitals and prolonged overall survival, demonstrated by a nearly 4 month survival benefit. © 2018 Elsevier Inc. All rights reserved.

Keywords: Cytoreductive nephrectomy; High-volume hospital; National Cancer Database; Overall survival

1. Introduction

Cytoreductive nephrectomy (CN) aims to reduce the tumor burden, decrease clinical symptoms, and lengthen

the overall survival in men and women with metastatic renal cell cancer (mRCC).

In the early 2000s 2 landmark clinical trials demonstrated an overall survival benefit when CN was incorporated with interferon- α , the standard of care systemic therapy in use at that time. The European Organization for Research and Treatment of Cancer trial (EORTC 3047) trial revealed a 10-month increase in overall survival in patients

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receiving CN compared with interferon alone, and the Southwest Oncology Group Trial (SWOG 8949) showed that patients receiving CN along with interferon lived on average 3 months longer than those who received interferon alone [1,2]. Due to the rise of new agents in immunotherapy and targeted therapy in the last decade which can improve survival, there has been a renewed debate about the continued value of CN [3]. Because of the small magnitude of the survival benefit of CN, some have questioned whether these findings and the need for CN are still relevant in the era of targeted therapy for mRCC. Retrospective series provide some evidence that CN may be still beneficial in the targeted therapy era. For example, Heng et al. found an 11 months survival benefit for patients with synchronous metastases who underwent CN, compared with no CN, in mRCC patients treated with targeted therapy [4]. Another study showed an overall survival difference of nearly 10 months of patients who underwent CN and received targeted therapy vs. patients who only received targeted therapy [3]. However, the relatively small magnitude of the effect of CN on overall survival in mRCC means that high quality surgical care is paramount. One factor that has been consistently shown to be associated with positive surgical outcomes is the performance of complex surgery at high-volume hospitals.

Several studies have investigated the association with high-volume care and outcomes in other complex surgical procedures [5–8]. In nephrectomy, Hsu et al. recently showed in their meta-analysis a positive association between high-volume specialist hospitals and improved outcomes [9]. However, because individuals with mRCC have a more controversial indication for surgery as well as greater surgical and medical complexity they may stand to benefit even more from having surgery at a high-volume hospital. We therefore aimed to investigate whether CN at a high-volume hospital was associated with overall survival

in mRCC. We hypothesized that performance of CN at a high-volume hospital would be associated with a significantly prolonged overall survival for patients with mRCC. We also assessed the association between receiving CN at a high-volume hospital and 30-day mortality, 30-day readmissions, and receipt of subsequent systemic therapy.

2. Material and Methods

2.1. Data source

The National Cancer Database (NCDB), a joint program of the Commission on Cancer (CoC) of the American College of Surgeons and the American Cancer Society, is a national cancer registry that compiles data for more than 1,500 CoC-accredited cancer programs in the (US) and Puerto Rico [10]. About 70% to 86% of all newly diagnosed kidney cancer cases are captured and reported to this database [11,12]. The NCDB now contains approximately 34 million records from cancer registries across the United States.

2.2. Study cohort

Patients with confirmed mRCC (any cM+ disease) between 1998 and 2012 were identified using the International Classification of Disease for Oncology, Third Edition terms. Diagnostic confirmation was based on a positive histology, cytology, or microscopic confirmation. CN was defined as complete nephrectomy, radical nephrectomy, and any nephrectomy in continuity with the resection of other organs (Surgery at Primary Sites Codes 40, 50, and 70). Patients undergoing kidney surgery other than CN as well as those with unknown pathologic subtype and vital status were excluded (Fig. 1).

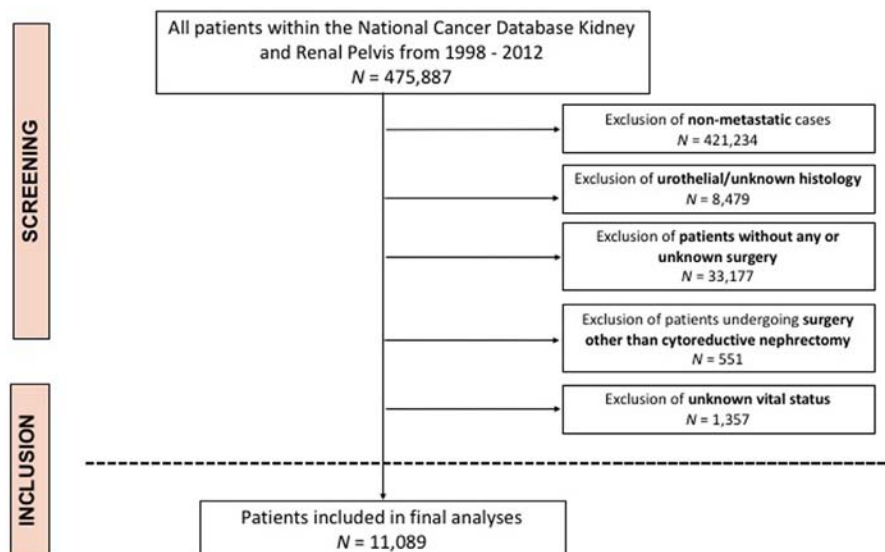


Fig. 1. Study cohort.

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