

# Outcomes of Laparoscopic Partial Nephrectomy in Patients Continuing Aspirin Therapy

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**Purpose:** A clinical dilemma surrounds the use of aspirin therapy during laparoscopic partial nephrectomy. Despite reduced cardiac morbidity with perioperative aspirin use, fear of bleeding related complications often prompts discontinuation of therapy before surgery. We evaluate perioperative outcomes among patients continuing aspirin and those in whom treatment is stopped preoperatively.

**Materials and Methods:** A total of 430 consecutive cases of laparoscopic partial nephrectomy performed between January 2012 and October 2014 were reviewed. Patients on chronic aspirin therapy were stratified into on aspirin and off aspirin groups based on perioperative status of aspirin use. Primary end points evaluated included estimated intraoperative blood loss and incidence of bleeding related complications, major postoperative complications, and thromboembolic events. Secondary outcomes included operative time, transfusion rate, length of hospital stay, rehospitalization rate and surgical margin status.

**Results:** Among 101 (23.4%) patients on chronic aspirin therapy, antiplatelet treatment was continued in 17 (16.8%). Bleeding developed in 1 patient in the on aspirin group postoperatively and required angioembolization. Conversely 1 myocardial infarction was observed in the off aspirin cohort. There was no significant difference in the incidence of major postoperative complications, intraoperative blood loss, transfusion rate, length of hospital stay and rehospitalization rate. Operative time was increased with continued aspirin use (181 vs 136 minutes,  $p=0.01$ ).

**Conclusions:** Laparoscopic partial nephrectomy is safe and effective in patients on chronic antiplatelet therapy who require perioperative aspirin for cardioprotection. Larger, prospective studies are necessary to discern the true cardiovascular benefit derived from continued aspirin therapy as well as better characterize associated bleeding risk.

**Key Words:** laparoscopy, nephrectomy, kidney neoplasms, aspirin

THE increasing incidence of coronary artery disease has made aspirin therapy common among patients in need of urological surgery. Although continued use of antiplatelet agents during surgery poses a risk of

bleeding, prudence must be exercised before preoperative cessation as this practice may potentiate thromboembolic complications. Patients with CAD have a threefold higher risk of a major thromboembolic event when off

## Abbreviations and Acronyms

BMI = body mass index  
CAD = coronary artery disease  
EBL = estimated blood loss  
LPN = laparoscopic partial nephrectomy  
PN = partial nephrectomy

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aspirin. The presence of a stented coronary artery drastically increases this risk to almost thirtyfold in all patients.<sup>1,2</sup>

Several institutions including the American College of Chest Physicians, American Heart Association, American Academy of Family Physicians and American College of Cardiology recommend aspirin not be held unless there exists an absolute contraindication. Similarly, the American Urological Association together with the International Consultation on Urological Diseases recently expressed support for continuing aspirin therapy throughout the perioperative period in patients with significant cardiovascular risk factors.<sup>3–6</sup> Nevertheless, distinct guidelines regarding the use of antiplatelet agents do not exist for all major urological procedures.

A particularly careful balance between preventing cardiovascular morbidity and minimizing the risk of bleeding must be achieved in the setting of PN, especially when performed laparoscopically. Significant intraoperative blood loss requiring transfusion or conversion to an open procedure is a recognized complication of the procedure with an incidence between 4% and 6%.<sup>7</sup> As such, the safety of continuing aspirin perioperatively is an important clinical issue.<sup>7</sup> Additionally, vascular control facilitates enhanced visualization during extirpation, and provides for a more controlled resection and renorrhaphy. Concern exists that uninterrupted antiplatelet therapy may preclude adequate hemostasis and compromise oncologic outcomes. To our knowledge, no reports to date detail the safety and perioperative outcomes associated with continuing aspirin during laparoscopic partial nephrectomy. This represents a critical deficiency in the evidence-based manner with which renal surgery is performed. To this end, we describe the feasibility and outcomes associated with the continued use of aspirin during LPN.

## MATERIALS AND METHODS

After obtaining institutional review board approval, data from patients who underwent LPN at our institution between January 2012 and October 2014 were retrospectively reviewed and entered in the study database. The database included information on patient age, gender, BMI, comorbidities (specifically a history of hypertension, diabetes, hyperlipidemia, CAD, myocardial infarction, congestive heart failure and percutaneous coronary intervention with stent placement), use and duration of aspirin and other antiplatelet or anticoagulant therapies, indication for antiplatelet therapy, tumor characteristics (laterality, size, complexity based on R.E.N.A.L. nephrometry score and PADUA score, histology, and grade), and perioperative parameters such as American Society of Anesthesiologists® score, EBL, volume of intravenous

fluids administered, operative time and warm ischemia time.<sup>8,9</sup>

Patients identified as having been on chronic antiplatelet therapy for primary and secondary prevention (eg history of myocardial infarction or percutaneous coronary intervention) were stratified into 2 groups based on whether aspirin therapy had been held or continued in the perioperative period. In the case of patients on dual antiplatelet therapy (aspirin and clopidogrel) or also an oral anticoagulant (eg dabigatran or warfarin), aspirin was the only treatment continued during surgery, with the second therapy held 5 to 11 days before surgery based on preoperative cardiology recommendations. In all cases the decision to stop or continue aspirin in the perioperative period was made before surgery, and based on a thorough assessment of the risks and benefits and joint decision making among the urologist, cardiologist and patient.

Surgical technique was not modified in the setting of aspirin therapy. All patients underwent LPN via a transperitoneal approach during which control of the renal artery and vein was achieved with hilar clamping. Tumor resection was performed with cold shears after which the resection bed was coagulated using an argon beam. Renorrhaphy was performed in a running fashion using zero V-lock sutures.<sup>10,11</sup>

Patient demographics, operative time, warm ischemia time, surgical outcomes, tumor pathology, and postoperative complications Clavien II or greater (in accordance with the modified Clavien-Dindo classification scheme) were reported.<sup>12</sup> Surgery was performed by 4 high volume, fellowship trained urologists (LRK, LR, MV, MS). Operative time encompassed initial skin incision, port placement, dissection, mass removal and final skin closure. Outcomes analyzed for both cohorts included the incidence of major complications (categorized as Clavien III or greater), occurrence of cardiovascular events, EBL, requirement for blood transfusion, operative time, and difference between preoperative and nadir postoperative hematocrit. Surgical margins on the final pathology specimen were also assessed as a surrogate metric of oncologic efficacy.

Descriptive statistics are reported as median and interquartile range for continuous variables, and frequency and percent for categorical variables. The Mann-Whitney-Wilcoxon U test was used to compare the medians of continuous variables, and the chi-square and Fisher's exact test were used to compare incidences for categorical variables. All tests were 2-tailed and  $p < 0.05$  was considered statistically significant. All analysis was done using Stata® version 13.0.

## RESULTS

Of the 434 patients who underwent LPN between 2012 and 2014, 101 were on chronic antiplatelet therapy, 29 of whom were on aspirin for secondary prevention (table 1). Aspirin therapy remained uninterrupted for 17 patients, the primary reason being a history of CAD with percutaneous coronary intervention. The preoperative dose regimen was

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