

Perioperative Results of Open Renal Surgery in Patients with Dual Antiplatelet Therapy

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1. Abstract

1.1. Background: Renal Cell Carcinoma (RCC) accounts for approximately 3% of all malignant diseases. As the population in the Western world grows older more patients are treated with Dual Antiplatelet Therapy (DAPT) for cardio-vascular diseases. We sought to understand the morbidity associated with open surgical for presumably malignant renal masses in patients undergoing open renal surgery.

1.2. Methods: 2,913 patients underwent renal surgery between 2011 and 2021. Out of these patients we identified 19 patients who underwent surgery on continued clopidogrel and aspirin DAPT. Surgery was performed by one single surgeon. Institutional review board permission was granted to perform this analysis.

1.3. Results: Median age was 66.8 years (range 46.1-84.8) with a median Charlson comorbidity index of 6 (range 2-9). Median size of the renal tumors was 5.6 cm (range 1.9-11.5). R.E.N.A.L. nephrometry score was low in 10.5%, intermediate in 15.8% and high 73.7%. Median blood loss was 143 cc (range 10-800). Transfusion was needed in 2 patients. Clavien-Dindo complications were grade at a median of 1.5 (range 0-4) in 6 patients with one patient suffering from a grade IV Non ST-Elevation Myocardial Infarction (NSTEMI).

1.4. Conclusions: Renal surgery without discontinuation of the combination of aspirin and clopidogrel is feasible and safe in selected cases if performed by an experienced surgeon.

2. Background

Renal Cell Carcinoma (RCC) accounts for approximately 3% of

all malignant diseases and has a rising incidence by 2% within the last two decades [1, 2]. RCC accounts for 90% of all kidney cancer with upper tract urothelial cancer being the second most common entity of renal neoplasm [1]. Dual Antiplatelet Therapy (DAPT) after implantation of Drug Eluting Stents (DES) reduces cardiac events post intervention but increases risk of bleeding. Although optimal duration of DAPT has not yet been established, DES implantation has become the standard of care for the treatment of coronary arteriosclerosis and most patients will remain in DAPT for at least one year [3]. But also other cardiovascular condition might lead to the need of long term DAPT [4]. During workup after cardiological emergency intervention renal lesions might be detected for the first time or DAPT might induce gross hematuria from renal masses. Active surveillance is an option to manage elderly patient harboring a small renal mass but in younger patients and symptomatic patients this strategy eventually is putting patients at risk [5-8]. Especially larger or symptomatic renal masses urge for surgical therapy as most ablative techniques may have an increased risk of bleeding or are not feasible to control the lesion [9, 10]. In small renal masses need for surgical intervention might be questionable within the first year of cardiac intervention but showed to be safe and feasible [11-14]. We sought to understand the morbidity associated with open surgical intervention for larger or clinically symptomatic renal masses in patients undergoing open renal surgery.

3. Methods

From our prospective institutional database on patients undergoing renal surgery between 2011 and 2021 we included 2,913 patients

with malignant histology of whom 1,861 had a partial nephrectomy after institutional review board approval was granted. Out of these patients we identified 19 patients who underwent surgery while they were on continued clopidogrel and aspirin dual antiplatelet therapy indicated for chronic cardiac disease due to various reasons. These 19 patients had an indication for renal surgery due to evidence of clinically relevant malignant renal tumors or bleeding. The indication for surgery was made multidisciplinary discussion and shared decision-making including cardiology, anesthesiology and patients. Surgery was performed by one single surgeon. Active surveillance or ablation therapy was not considered and option or denied by the patients. In this retrospective analysis descriptive statistics were performed using the IBM SPSS version 26 statistical package (IBM Corp., Armonk, NY, USA) were used to estimate surgical outcomes and Clavien-Dindo classification [15] to grade complications. The R.E.N.A.L. nephrometry score and the Charlson Comorbidity Index (CCI) were estimated prior to surgery [16, 17].

4. Results

Patients were predominantly male (n=14, 73.7%) with a median age of 66.8 years (range 46.1-84.8). The Charlson comorbidity index was at a median of 6 (range 2-9). Patients had a median of 2 (range 0-3) drug eluting stents implanted into their coronary arteries. Baseline patient characteristics and indication for dual platelet inhibition is given in (Table 1). All patients were rated ASA score IV. All patients were on a combination of acetylsalicylic acid 100mg and clopidogrel 75mg od. Median size of the renal tumors was 5.6 cm (range 1.9-11.5). R.E.N.A.L. nephrometry score was low in n=2 (10.5%), intermediate in n=3 (15.8%) and high in n=14 (73.7%). Surgical approach was lumbar in n=8 (42.1%) and transperitoneal in n=11 (57.9%) of the patients. The tumor was located on the left side in n=10 (52.6%) of the patients. Median duration of surgery was 85 minutes (range 45-129). Median clamping time was 11min [9-17]. Median blood loss was 143 cc (range 10-800). Transfusion was needed in 2 patients, in one case during surgery as a consequence of pre-existing anemia and one patient had 2 vials of blood after bleeding from the incision of the drainage on day 5 post-surgery when the drain was removed. N=17 patients were admitted to the ICU for postsurgical surveillance with a median stay of 1 day (range 1-5). Median hospital stay was 9.4 days (range 6-14).

Histological results are given in (Table 2), proving histological aggressiveness in the selected patient cohort. Median Clavien-Dindo complications were grade 1.5 (range 0-4) with 6 patients experiencing post-surgical complications and one patient suffering from a grade IV Non ST-Elevation Myocardial Infarction (NSTEMI) having to get a new drug eluting cardiac stent implanted and one patient having a grade III bleeding from the skin incision of the wound drainage needing stitching and transfusion of one blood vial. One patient suffered from pneumonia grade I according to clinicsofsurgery.com

the Common Terminology Criteria for Adverse Events (CTCAE) criteria. All other complications were local hematoma around the kidney of less than 3cm in diameter not needing any further intervention (Clavien Dindo grade I n=3) No grade V complications were seen (Table 3).

Table 1: Baseline patient characteristics

Age, Median (years)	66.8 (range 46.1-84.8)
Male	n=14 (73.7%)
Tumor Size, Median (cm)	5.6 (range 1.9-11.5)
Type of Surgery	
Nephrectomy	n=7 (36.8%)
With lymphadenectomy	n=1 (5.3%)
With caval thrombus removal (stage II)	n=1 (5.3%)
Partial Nephrectomy	n=8 (42.1%)
Nephro-ureterectomy	n=2 (10.5%)
R.E.N.A.L. Nephrometry Score	
Low	n=2 (10.5%)
Intermediate	n=3 (15.8%)
High	n=14 (73.7%)
Charlson comorbidity index CCI	
CCI 2	n=2 (10.5%)
CCI 3	n=3 (15.8%)
CCI 4	n=1 (5.3%)
CCI 5	n=2 (10.5%)
CCI 6	n=2 (10.5%)
CCI 7	n=6 (31.6%)
CCI 8	n=1 (5.3%)
CCI 9	n=2 (10.5%)
Indication for dual platelet inhibition	
Drug eluting coronary stent	n=15 (78.9%)
A. carotis stent	n=1 (5.3%)
A. basilaris stent	n=1 (5.3%)
Ventricular Arrhythmia	n=1 (5.3%)
Aortic Valve Stenosis, Myocardial Infarction	n=1 (5.3%)
Myocardial Infarction	n=16 (84.3%)

Table 2: Pathological Results

T-Stage	n	%
pT1a	5	26.30%
pT1b	4	11.20%
pT2a	1	5.30%
pT3	1	5.30%
pT3a	6	31.60%
pT3b	1	5.30%
pT4	1	5.30%
Grading		
G1	1	5.30%
G2	10	52.60%
G3	8	42.10%
Subtype		
Clear cell RCC	16	84.20%
Collecting Duct RCC	1	5.30%
Papillary RCC Type 1	1	5.30%
Urothelial Cancer	1	5.30%

Table 3: Post-surgical complications

Type	n=	%
no complication	13	68.40%
Hematoma 2cm, no intervention	1	5.30%
Hematoma 3cm, no intervention	2	10.60%
Bleeding from drainage incision	1	5.30%
NSTEMI post surgery	1	5.30%
pneumonia °I	1	5.30%

5. Discussion

It might be challenged whether patients with Small Renal Masses (SRM) on DAPT need surgery. Size alone is not predictive of oncological outcomes in SRM [18-21]. Recurrence and metastatic potential of SRMs is higher as historically thought and has to be estimated at about 10% in SRM, urging for intervention if the expected life span of a patient is longer than 5 years [1, 22-24]. In our patient cohort the indication for intervention therefore was not based solely on size. A general question in an elderly and comorbid population of patient remains whether they need therapy at all. But the overall survival of patients with an elevated Charlson comorbidity index is 0-90% rendering this score informative but not decisive to choose a specific therapeutic approach [25]. As shown in our series we were not treating patients without an oncologic reason. One might think of biopsy to prove aggressiveness prior to surgical intervention, but biopsy results are not predictive of aggressiveness, nor can they surely determine histology or grading [26]. On the other hand biopsy harbors a significant risk of bleeding in patients under DAPT. As there was no doubt from pre-surgical imaging and clinical appearance that surgery was the only treatment option, the indication for removal was given without further initial histological proof. Active surveillance might be an option for some patients, but others are accepting any effort and risk just to get their tumor removed. If DAPT cannot be interrupted or terminated surgery just might be undertaken without a surveillance phase after thorough counseling the patient. We did not see any major complications. Only one bleeding occurred post surgically. It was related to the removal of a surgical drain that was placed at the end of surgery to monitor bleeding and eventually drain urine. It was removed on day 5 after surgery without ever having produced any excretion. After removal internal bleeding occurred from the canal and could be controlled by applying pressure to the incision for a little while. No further intervention or transfusion was needed, thus rendering this the only Clavien-Dindo grade III event in the series. In patients treated after that event we restrained from using any drains and did not see any further problems. In line with other literature reports who proof that one can safely omit the surgical drains in renal surgery [27]. Given the low complication rate, renal surgery in patients on DAPT is safe and feasible in experienced hands.

Our series is limited by its small sample size and a high selection bias, as well as there was only one surgeon performing the proce-

dures. In fact, this report is not about oncological features of RCC in this highly selected population, but about the surgical feasibility and possibility to perform renal surgery on DAPT. Thus, further studies should focus on the indication and prognosis of RCC in this population.

6. Conclusion

Renal surgery without discontinuation of the combination of aspirin and clopidogrel is feasible and safe in selected cases if performed by an experienced surgeon. Further multi-centric investigation should focus on standardization of surgical procedures and oncological versus surgical outcomes.

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