

1 **Case Report**

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3 **Retroperitoneoscopic single site 3-D adrenalectomy for left adrenal renal cell carcinoma**
4 **metastasis 20 years after left laparotomic radical nephrectomy**

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23
24 **Abstract**

25 The aim of the paper is to demonstrate the practicability of retroperitoneoscopic single site 3-D left
26 adrenalectomy after previous homolateral laparotomic renal surgery. We present a case report of a
27 70-year-old male who underwent radical nephrectomy in 1999. Twenty years after radical
28 nephrectomy, the patient underwent a computed tomography (CT) scan for B-cell lymphoma
29 follow-up, which revealed a 30 mm left adrenal mass suspicious for a delayed renal-Cell Carcinoma
30 metastasis. After multidisciplinary discussion, surgery was chosen as first option. To minimize
31 surgical morbidity as much as possible, a 3-D laparoscopic single site retroperitoneal approach was
32 chosen. The patient had no peri or intra-operative complications and was discharged on post-
33 operative day 3. Final histological report revealed an adrenal Clear cell Renal-Cell Carcinoma
34 (CRCC) metastasis. This experience shows that single site retroperitoneal laparoscopic

35 adrenalectomy is possible in patients who underwent previous abdominal cancer surgery and is an
36 option to consider when determining optimal approaches for adrenal surgery.

37

38 **Keywords:** Adrenalectomy, laparoscopy, laparoendoscopic single-site surgery, renal cell carcinoma
39 metastases

40

41

42 **INTRODUCTION**

43 Renal-Cell Carcinoma (RCC) accounts for about 2% of all cancers. Up to 30% of patients
44 experience metastasis at diagnosis or during follow up^[1]. The most common localizations of RCC
45 metastasis are lung, liver, bone, adrenal, brain, and nodes. Late single metastatic RCC recurrence,
46 more than 10 years after nephrectomy, in ipsilateral or contralateral adrenal gland is a rare event
47 reported in 3% and 0.7% of remaining kidney units, respectively^[2]. In case of single metastasis or
48 recurrent disease, surgery can be considered as a treatment option in those patients who have a
49 favorable risk profile and in whom complete resection is achievable^[3]. The surgical approach must
50 be chosen according to the patient's characteristics, size of the lesion and surgeons' expertise^[4].
51 Nowadays, minimally invasive surgery is the gold standard for the treatment of urological
52 malignancies and many techniques are being developed in order to reduce surgical morbidity as
53 much as possible. In particular laparoscopic adrenalectomy series in literature show low morbidity
54 and complication rates in addition to short hospital stays^[4]. Moreover retroperitoneoscopic
55 approach as well as single port approaches have shown equivalent or favorable perioperative
56 outcomes to be a justified alternative for advanced surgeons^[3-4]. We present a case report of a 70-
57 year-old male who underwent retroperitoneoscopic single-site left adrenalectomy for adrenal RCC
58 metastasis 20 years after laparotomic adical nephrectomy for CRCC.

59

60 The aim of our work is to show the practicability of 3-D Retroperitoneoscopic Single-Site
61 retroperitoneal adrenalectomy after previous homolateral renal surgery.

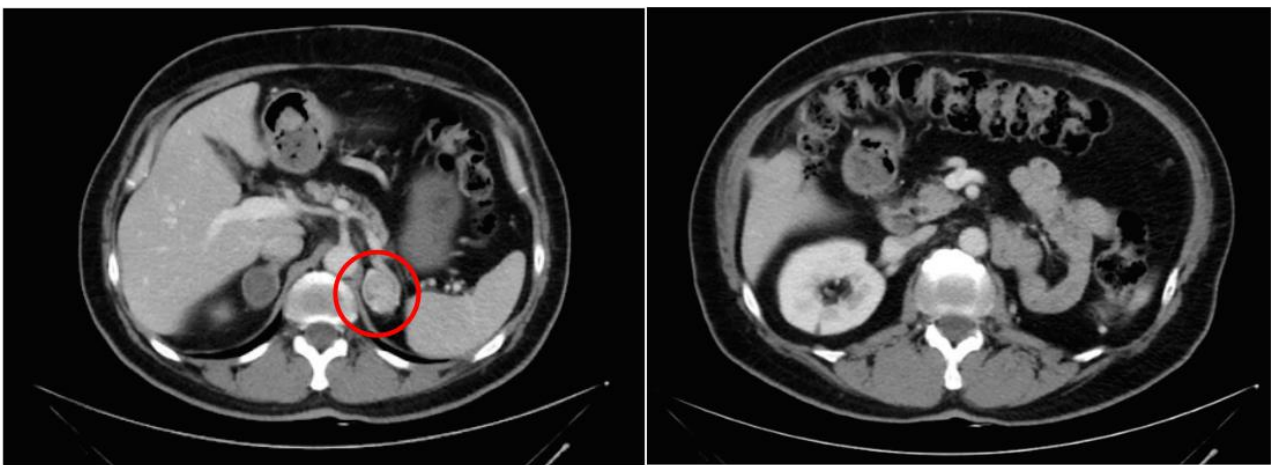
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63 **CASE REPORT**

64 We present a 70-year-old Caucasian male with a history of hypertension, Benign Prostatic
65 Hyperplasia and previous B cell Lymphoma with negative follow-up. In May 1999, he underwent
66 laparotomic left RN for a 10-cm CRCC of middle/lower pole of the left kidney with thrombosis of
67 the left renal vein and peri-renal fatty tissue invasion (pT3b N0) no ipsilateral adrenalectomy was
68 performed at that time due to surgeon's preference. The patient was thereafter followed for 10 years

69 according to the renal cancer European Association of Urology (EAU) guidelines^[1]. In May 2019,
70 due to a lateral cervical mass, the patient underwent left lateral cervical lymph node dissection with
71 diagnosis of stage IA G3 B cell lymphoma, subsequently treated with local radiation therapy. In
72 September 2019, a CT scan performed for routine lymphoma follow-up, revealed an
73 inhomogeneous left adrenal solid expansive lesion of 30 mm × 20 mm [Figure 1]. A multi-
74 disciplinary meeting with hematologists, oncologists and endocrinologists was scheduled and
75 indication to surgery, with diagnostic and curative intent, was proposed. In consideration of the
76 previous surgery and of the localization of the mass, a retroperitoneal approach was chosen;
77 moreover, retroperitoneoscopic single-site technique was considered to reduce morbidity.

78



79

80 **Figure 1.** CT scan showing the adrenal solid expansive lesion (30 × 20 mm) mass and left empty
81 renal lodge. CT: Computed tomography

82

83 **Surgical procedure**

84 In November 2019, the patient underwent left retroperitoneoscopic single-site adrenalectomy.
85 Utilizing a left lateral decubitus position, a 2.5-cm lateral incision was made [Figure 2] at the tip of
86 the twelfth rib through which a single site gel port (GelPOINT® Advanced Access Platform,
87 Applied Medical, Rancho Santa Margarita, CA, USA) [Figure 2]. The retroperitoneal operating
88 space was created with an air inflating balloon as previously described^[5]. A standard 10-mm, 0-
89 degree 3-D laparoscopic camera [Image 1 S TM 3-D (Karl Storz, Tuttlingen, Germany)] was used
90 throughout the procedure in addition to standard and bent single port laparoscopic 5-mm
91 instruments. The caiman® 5 (Braun Vetcare, 78532 Tuttlingen, Germany) was used for dissection
92 and vessel sealing. The adrenal gland was identified and bluntly isolated from the psoas, posteriorly
93 and inferiorly from the colon. The left adrenal vein was identified, isolated and secured using 5mm
94 polymer clips. The specimen was removed within a retrieval bag and a 20 Fr drainage was placed in
95 the lateral part of the incision [Figure 3].

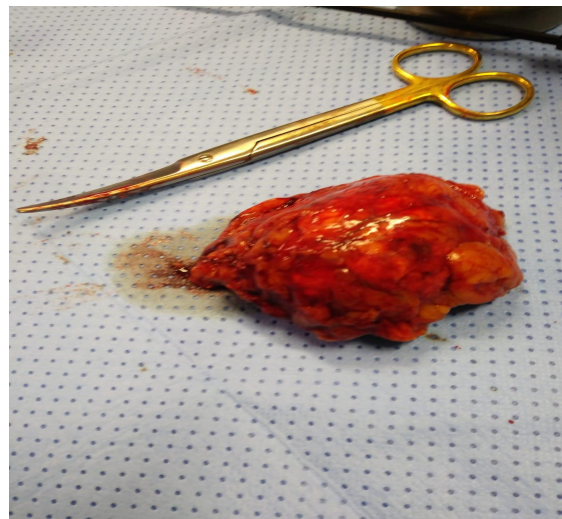
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98 **Figure 2.** 2.5-cm incision at the tip of the 12th rib and single site gel port GelPOINT® Advanced
99 Access Platform (Applied Medical, Rancho Santa Margarita, CA, USA)

100



101
102 **Figure 3.** Adrenal specimen.

101

102

103

104 **Results surgical procedure**

105 Total surgery time was 92 min. The patient had no peri-operative complications and was discharged
106 on post-operative day 3. Final histological report revealed an adrenal CRCC metastasis with
107 positive immunophenotype for Vimentin CD10, CAM5.2, CKAE1/AE3 and negative
108 immunophenotype for CK7, CD117 and inhibin.

109

110 **DISCUSSION**

111 CRCC metastases occur during follow-up in about 1/3 of patients^[2]. Typical locations of metastases
112 are brain, lungs, bones, liver and adrenals. The optimal treatment for locally recurrent RCC is still
113 under debate and according to EAU guidelines surgical treatment for recurrent disease must be

114 offered when technically feasible, when complete resection of the mass is achievable and in lack of
115 major comorbidities^[1]. However, in the era of targeted molecular therapies surgical metastasectomy,
116 when feasible, remains the gold standard treatment, with 5-year cancer specific survival of 60%^[3].
117 Indeed, systemic immunotherapies with interferon and interleukin-2 (IL-2), or more recent
118 therapies with multikinase inhibitors (sorafenib, sunitinib, pazopanib, axitinib, lenvatinib and
119 cabozantinib), mTOR inhibitors (temsirolimus and everolimus); monoclonal antibody against the
120 eGFR (bevacizumab), and immunomodulatory drugs (nivolumab, ipilimumab, atezolizumab,
121 pembrolizumab and avelumab), alone or in combination, have been shown to improve survival and
122 oncological results with complete responses in less than 10% of patients and are burdened by
123 frequent and occasionally severe toxicity^[6]. Moreover, many studies shown a significant increase of
124 CSS and median overall survival in patients treated with complete metastasectomy compared with
125 those in which surgery was incomplete or omitted^[7]. In the current paper we present a very delayed
126 onset of adrenal CRCC metastasis, 20 years after the removal of primary tumor. We chose to avoid
127 biopsy because of the double usefulness of surgery as diagnostic and curative intent. Favorable
128 predictors of survival after RCC metastasis resection are: 1) diagnosis to occurrence of metastases >
129 1 year; 2) a unique metastatic site; 3) age < 60 years^[8]. Our patient presented with 2 out of 3
130 favorable characteristics. We planned to remove the adrenal mass with a single site laparoscopic
131 retroperitoneal approach in consideration of the shape, position and previous abdominal surgery.
132 Laparoscopic adrenalectomy was described for the first time in 1992 and has since become the most
133 used approach representing the gold standard treatment for adrenal masses due to low peri-operative
134 morbidity and low complication rates offering reduced post-operative pain, length of stay and
135 recovery time^[9-11]. The following minimal invasive techniques have been described to approach the
136 adrenal gland with laparoscopy and robotics: transperitoneal or retroperitoneal via the anterior or
137 lateral approach, single port transperitoneal or retroperitoneal. None of these techniques however
138 have demonstrated a clear superiority, highlighting the importance of the experience of the surgeon
139 and centre^[4]. Comparable safety and outcomes have been demonstrated between transperitoneal and
140 retroperitoneal laparoscopic approaches when performed by trained and skillful surgeons^[11-15]. The
141 same is true speaking about single-site laparoscopic surgery, where the choice of the technique and
142 of the approach are made by the surgeon according to his skills.

143

144 Single site laparoscopic adrenalectomy can be comparable, to multi-port approach as trans
145 peritoneal is comparable to the retroperitoneal^[16]. Advantages reported for single port surgery are
146 inferior blood loss, analgesic time and improved cosmetic satisfaction against longer operative time.
147 However, our operative time was lower or comparable to published results as well as our peri-

148 operative outcomes, post-operative pain, length of stay and recovery time. When the diagnosis of
149 adrenal CRCC metastasis was made, the case was discussed during the weekly multidisciplinary
150 meeting with the oncology team, the endocrinologist and radiotherapists and the final indication
151 was to continue with follow-up and not to perform immediate systemic treatments. The role of
152 multidisciplinary approach is pivotal in the tailored management of these patients.

153

154 Minimally invasive surgical approaches and techniques must be tailored case by case according to
155 the facilities and skills of the surgeon, and patient characteristics. In the current report we show that
156 single site retroperitoneal laparoscopic adrenalectomy is a possible procedure for patients who
157 underwent previous trans peritoneal abdominal surgery and is an option to consider when
158 determining optimal approaches for adrenal surgery. However, the Retroperitoneoscopic Single-Site
159 technique should be pursued only when it doesn't compromise the overall and oncological safety of
160 the patient and the surgeon has the expertise to perform the procedure.

161

162 **DECLARATIONS**

163 **Authors' contributions**

164 Conceptualization, Writing - original draft, project administration: Naspro R, La Croce G

165 Methodology, Formal analysis: La Croce G

166 Data curation, Writing - review & editing: Roscigno M, Pellucchi F, Lerner L, Rossini A, Cassibba
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168 Conceptualization, Supervision: Naspro R, Da Pozzo LF

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170 **Availability of data and materials**

171 Not applicable.

172

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174 None.

175

176 **Conflicts of interest**

177 All authors declared that there are no conflicts of interest.

178

179 **Ethical approval and consent to participate**

180 Not applicable.

181

182 **Consent for publication**

183 A written informed consent for publication was obtained.

184

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