

The Necessity of Adrenalectomy at the Time of Radical Nephrectomy: A Systematic Review

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Purpose: We describe the literature base pertaining to adrenalectomy at radical nephrectomy and present a pragmatic approach based on primary tumor and disease characteristics.

Materials and Methods: Literature searches were performed via the National Center for Biotechnology Information databases using various keywords. Articles that pertained to the concomitant use of adrenalectomy with radical nephrectomy were surveyed.

Results: The incidence of solitary, synchronous, ipsilateral adrenal involvement, ie that which is potentially curable with ipsilateral adrenalectomy along with nephrectomy, is much lower than previously thought at 1% to 5%. Evidence to date supports increased size and T stage, multifocality, upper pole location and venous thrombosis as risk factors for adrenal involvement. Cross-sectional imaging is now accurate at demonstrating the absence of adrenal involvement but still carries a significant risk of false-positives. The morbidity of adrenalectomy is minimal except in those patients with metachronous contralateral adrenal metastasis in whom the impact of adrenal insufficiency can be devastating. Disease specific and overall survival of those undergoing radical nephrectomy, with or without adrenalectomy, are similar. The survival of patients with widespread metastatic disease is historically poor regardless of whether adrenalectomy is performed. There is evidence for a survival advantage in patients with isolated adrenal metastasis, although this group comprises no more than 2% of those undergoing surgery for renal tumors.

Conclusions: The apparent benefit of ipsilateral adrenalectomy does not support it as a standard practice in all patients with normal imaging. However, it should be considered in select cases in which there are risk factors for adrenal involvement.

Key Words: adrenalectomy; adrenal gland neoplasms; nephrectomy; carcinoma, renal cell; kidney neoplasms

IPSILATERAL adrenalectomy has been an integral part of traditional radical nephrectomy as first described by Robson et al in 1969.¹ To attain a wide surgical margin and to avoid violating Gerota's fascia as dictated by oncological surgical principles, it was

thought necessary to include ipsilateral adrenalectomy at radical nephrectomy. The incidence of adrenal involvement found by Robson et al and the relative ease of ipsilateral adrenalectomy with nephrectomy further supported this assertion. The ipsilat-

Abbreviations and Acronyms

CT = computerized tomography
MRI = magnetic resonance imaging
NPV = negative predictive value
PPV = positive predictive value
RCC = renal cell carcinoma
RNx = radical nephrectomy
SSIAI = solitary synchronous ipsilateral adrenal involvement

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eral adrenal was thought to be at risk for involvement with renal cell carcinoma because of its juxtaposition to the kidney and multiple potential pathways for spread of kidney cancer. The ipsilateral adrenal may be involved by tumor through local extension of a nearby renal tumor, by lymphatic spread through shared lymph drainage, through arterial embolization or through retrograde venous embolization, this being deemed possible secondary to the propensity of RCC to involve the renal veins and inferior vena cava. Some have also proposed that there are small vessels that traverse the fibrous septum between the kidney and the ipsilateral adrenal that provide an additional direct path of spread from one to the other.²

The emergence of nephron sparing surgery in which the adrenal gland is spared and the outcomes of contemporary surgical series have challenged the need for routine adrenalectomy in the management of clinically localized renal cancer. In retrospect, evidence supporting the practice is sparse. Although survival outcomes from radical nephrectomy were superior to simple nephrectomy during the decade that followed the publication of work by Robson et al in 1969, it is not clear whether this finding can be attributed solely or even in part to the addition of ipsilateral adrenalectomy.^{3,4} Furthermore, downward stage migration may have rendered the observations of Robson et al inapplicable to contemporary series.⁵⁻⁷ As of 1995, 25% to 40% of renal masses were detected incidentally and most at small size.⁸ Whereas no serious morbidity or mortality has been attributed to ipsilateral adrenalectomy concurrently executed with radical nephrectomy,⁹ the oncological efficacy of nephron sparing approaches and subsequent adrenal sparing radical nephrectomy in multiple large series does not support the necessity of adrenalectomy.¹⁰⁻¹⁸

Although many practitioners currently do not perform ipsilateral adrenalectomy at radical nephrectomy, it is still advocated by prominent urological associations. As late as 2001 in an assessment of the current controversy the European Association of Urology still recommended traditional radical nephrectomy, including all components within Gerota's fascia and lymphadenectomy, as the treatment of choice for organ confined renal cell carcinoma.¹⁹ It is acknowledged that this is "a matter of ongoing research" but adrenalectomy is still "generally recommended." In this review we survey the pertinent literature about the role of adrenalectomy at radical nephrectomy and make recommendations regarding when the practice is most likely to benefit patients.

MATERIALS AND METHODS

To identify all pertinent materials literature searches were performed via the National Center for Biotechnology Information databases using the key words adrenal gland, adrenalectomy, adrenal metastasis, adrenal invasion, adrenal neoplasm, radical nephrectomy, renal neoplasm, renal cell carcinoma, renal cell cancer and kidney cancer. From the more than 1,000 articles that resulted from these searches 60 that pertained directly to adrenal involvement with RCC in the last 30 years were identified through review of abstracts or through reference in other pertinent articles. Survey of the entirety of these articles revealed 33 with a significant contribution to 1 or more aspects of the topic at hand. A total of 27 works assessing the usefulness of adrenalectomy at radical nephrectomy were selected on the basis of sample size and specific assessment of the proposed clinical scenario (table 1). These series comprise the major source for the current review. Data regarding the incidence and ease of preoperative diagnosis of adrenal involvement, as well as clinical indications for, and morbidity, efficacy and outcomes of concomitant adrenalectomy at radical nephrectomy were extracted, forming the basis of this review.

RESULTS/DISCUSSION

Several considerations help to elucidate whether ipsilateral adrenalectomy is a necessary component of radical nephrectomy. The incidence of ipsilateral adrenal involvement with RCC is paramount to determining if the removal of the gland is likely to be of therapeutic benefit. If adrenal involvement is a rare event then the benefits afforded the few would not suffice to substantiate the practice in all patients. Assuming that the incidence is significant it must then be determined if those at highest risk can be identified preoperatively to spare those who are at minimal risk. The morbidity of the procedure must be carefully examined to understand the consequences of removing the adrenal and the ease with which nephrectomy can be performed without it. Clearly excessive morbidity of ipsilateral adrenalectomy does not exist or the practice would not currently be recommended. However, there are subtleties to consider in patients with an extended life expectancy. Survival outcomes must also be deconstructed to reveal what effect adrenalectomy has on overall survival. Are those with low stage disease afforded any survival advantage with ipsilateral adrenalectomy and is the survival of those with high stage disease too poor to be affected?

Incidence

The incidence of adrenal extension of RCC was 7% to 23% in autopsy series of individuals with disseminated disease but the incidence was 19% if only ipsilateral disease was included in this comparison.²⁰⁻²² At radical nephrectomy adrenal involvement was noted in 1.2% to 10% of specimens.^{20,21,23-29}

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