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Renal tumor structured reporting including nephrometry score and beyond: what the urologist and interventional radiologist need to know

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Abstract

The purpose of this paper is to describe cross-sectional imaging anatomic and morphologic parameters of solid renal tumors that urologists and interventional radiologists need for precise management, review the commonly used terms and descriptors of those parameters, and suggest a comprehensive reporting system for detected masses.

Key words: Renal—Mass—Surgical—Planning—Nephrometry score—Ablation

Due to the increasing use of cross-sectional imaging, 66% of renal masses are now detected incidentally, increasing the number of diagnosed cases of renal cell carcinoma [1, 2]. As the number of incidentally detected tumors has risen, so has the drive for the performance of more minimally invasive surgical options. Concomitantly, mounting evidence has shown that nephron-sparing surgery may reduce the morbidity and mortality resulting from renal insufficiency [3]. Because of these factors, surgeons are performing more difficult surgeries on more complex renal lesions with an ever-increasing range of options, including observation, open surgery, robotically assisted surgery, standard laparoscopic surgery, laparoendoscopic single-site surgery, and percutaneous and laparoscopic ablation [4].

The Nephrometry Score is an imaging-based (CT and MRI) scoring system commonly used by urologists to standardize the reporting of solid renal masses by enabling quantification of anatomical characteristics [5]. Assigning a nephrometry score has become more common in urologic literature. We reviewed the main validations published to assess the relationships between this score and perioperative and postoperative variables. To date, the nephrometry score has been shown to correlate with operative ischemic duration, complication rates, and postoperative functional outcomes and plays an important role in surgical planning [6–9]. Additionally, multiple studies have verified the relative ease of use and reproducibility of the nephrometry scoring system [6].

This article describes and illustrates the nephrometry scoring system and proposes a user-friendly radiology template for routine reporting of renal tumor cases incorporating this scoring system. The percutaneous renal ablation complexity (P-RAC) scoring system is another scoring system that is preferable for nonsurgical cases, and this scoring system will be briefly discussed.

Nephrometry scoring system

Background and rationale

Surgical treatment decision making

Several studies have reported that less complex tumors are resected more frequently with laparoscopic partial nephrectomy (LPN), whereas high-complexity lesions are more likely to undergo open partial nephrectomy (OPN) or radical nephrectomy (RN) [10–13]. Tumor size and nephrometry score were independent factors for planning OPN over LPN or RN [10]. Gill et al. compared the tumor characteristics and reported that tumor size (2.6 cm in LPN vs 3.3 cm in OPN) and endophytic designation were significantly different between the two procedures [11]. In addition to these comparisons of two

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procedures, some authors prompted to identify cut-offs to determine which patients might be suitable for a particular approach. Naya et al. evaluated the morphological factors of tumors and reported that tumor size and nephrometry score were significant factors for the selection of LPN; a nephrometry score of 8 was suggested as the optimal cut-off values for the selection of LPN. A high nephrometry score is a significant predictor for selecting robotic over open surgery [13]. Funahashi et al. *concluded that* only endophyticity (cut-off, 16 mm) and distance from the sinus (cut-off, 4 mm) affected surgical planning.

Surgical complications

Hayn et al. showed that patients with a low-complexity Nephrometry score were less likely to experience a postoperative bleed or urinary fistula compared with moderate-complexity masses, whereas lesions with scores between 12 and 14 were five times more likely to have a postoperative urologic complication [8]. Another publication reported that each unit increase in nephrometry score was associated with an increased likelihood of a postoperative urine leak, with the ''E'' score being a significant predictor of the risk [14]. The nephrometry score is predictive of overall complications and warm ischemia time (WIT) following minimally invasive nephron-sparing surgery (MINSS) [7]. The same data also suggest that nearness to the collecting system may be used as a simple predictor of overall complications and postoperative hemorrhage following MINSS [7].

Postoperative functional outcomes

Cha et al. suggested that patients with greater ''nephrometric variables'' (R) and (E) were more likely to experience postoperative renal impairment after PN [15].

Histologic features

Investigators found a high correlation between the nephrometry score and tumor grade (*P* .0001) and histologic features (*P*. 0001). Specifically, papillary RCCs had the lowest total nephrectomy score and clear cell RCCs had greater nephrectomy scores. Furthermore, benign lesions tended to be smaller, more endophytic, and nonhilar [16]. Higher nephrometry scores have been shown to correlate with pathologic stage, nuclear grade, and death from renal cell carcinoma [6].

Clinical trial measurements

Patients with unresectable RCC were treated with neoadjuvant sunitinib and were assigned a nephrometry score. At baseline, 81% of tumors were categorized as high complexity, and 46% were downgraded to moderately complex after treatment, which facilitated surgery. The decrease in the tumor proximity to the central hilar structures was the main parameter that reduced the nephrometry score and decreased the surgical complexity [17].

Reproducibility of the nephrometry score system

In this retrospective study of 95 patients, six reviewers (staff urologists, radiologists, house staff, and one medical student) independently assigned a nephrometry score. The highest concordance was with the ''R'' designation, and the ''N'' component had the lowest concordance. The authors concluded that assigning a nephrometry score was reliable and required minimal training [6]. Three fellowship-trained urological oncologists evaluated the preoperative imaging studies of 51 patients who underwent partial nephrectomy and scored them according to nephrometry score system. The nephrometry scoring system had good interobserver reliability. Quantifying the tumor location (L) was more challenging and the least reliable of the five components [18].

Assigning the nephrometry score

The R.E.N.A.L (radius (R), exophytic/endophytic properties (E), nearness of tumor to the collecting system or sinus in millimeters (N), anterior/posterior (A), and location relative to polar lines (L)) nephrometry scoring system was introduced as an objective reproducible means to describe salient renal tumor anatomy (Table 1) [5]. For each variable, one to three points are assigned. A letter describing the tumor's relation to the coronal plane of the kidney (A for anterior, P for posterior, and X for tumors that are neither; for example, at the renal poles) is then added to the score. A tumor gets a total of 4 points for the least complex and 12 points for the most complex mass. The score is read as each individual variable (e.g., 1 + 2 + 2 + A + 3) summed to a score and followed by the location relative to the coronal plane of the kidney (e.g., 8A). Tumors are stratified into low complexity (< 7 points), moderate complexity (7–9 points), and high complexity (> 9 points). An online tool has been developed to facilitate calculation at the point of care (www.nephrometry.com).

(R)adius

Maximum tumor dimension can be measured on standard imaging projections. However, it has been observed that standard imaging projections might not capture the maximum tumor diameter and are prone to over or underestimation of tumor size [19, 20]. This is particularly true if the longest tumor diameter is not aligned with the planes of standard imaging projections (Axial, Sagittal, and Coronal). We advocate to measure maximum tumor dimension using oblique reformat in a tilted plane that accounts for the angulation of the longest

Table 1. R.E.N.A.L. nephrometry score [5] is based on five critical and reproducible anatomical features of solid renal masses

Component	1 Point	2 Point	3 Point
R (radius; maximum dimension in cm)	≤4	> 4 but < 7	≤ 7
E (exophytic/endophytic)	≥50% exophytic	< 50% exophytic	Completely endophytic
N (nearness to collecting system/sinus in mm)	≤7	> 4 but < 7	≥ 4
A (anterior/posterior)	Mass location gets a letter added to the score; "A" for masses anterior to the sinus, "P" posterior, and "X" for not applicable.		
L (location relative to polar lines) Suffix "h" assigned if the tumor touches the main renal artery or vein*	Entirely below lower polar or above upper polar lines	Mass crosses polar lines	50% of the mass is across the polar line, mass entirely between polar lines, or mass crosses the axial midline

Of the five components, four are scored on a 1-, 2-, or 3-point scale with the 5th indicating the anterior or posterior location of the mass relative to the coronal plane of the kidney
Asterisk is part of the scoring system

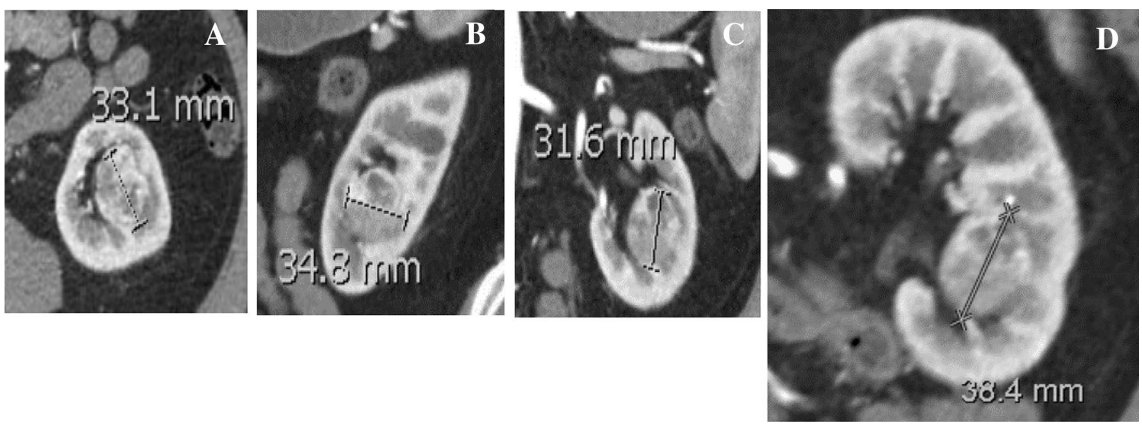

Fig. 1. Renal mass measured on standard axial (**A**), sagittal (**B**), and coronal (**C**) projections. The longest measured diameter is 3.5 cm. (**D**) Same tumor measured 3.8 cm on coronal oblique projection.

dimension of tumor and provides more accurate measurements (Fig. 1; Table 1). A tumor gets one point for maximum diameter equal to or less than 4 cm, two points for larger than 4 cm but smaller than 7 cm, and three points for diameter equal to or larger than 7 cm. A radius of 4 cm, until recently, was considered the maximum dimension for partial nephrectomy [21].

(E)xo/endophytic

(E)xo/endophytic status describes the tumor relationship to the surface of the kidney. Lesions that are predominately endophytic pose a greater surgical challenge than those that are exophytic [14, 22, 23]. A completely exophytic tumor with narrow attaching pedicle can be surgically excised without the need to clamp the renal artery, while a completely endophytic tumor would necessitate meticulous dissection of the renal artery before performing tumor resection. A tumor gets one point if half or most of its volume is exophytic to the renal surface, two points if most of its volume is endophytic, and three points if it is completely endophytic (Fig. 2; Table 1).

(N)earness to the collecting system

(N)earness to the collecting system describes the proximity of tumor's inner surface to that of the collecting system, best determined on excretory images. It is recognized and well described that depth of tumor penetration is an important variable that affects ease of nephron-sparing surgery and postoperative complication [24–26] (Fig. 3; Table 1). A tumor assigned one point if its innermost edge to the collecting system or renal sinus distance is 7 mm or more, two points if it is less than 7 mm but greater than 4 mm, and three points if it measures 4 mm or less. Standard planar projections tend to underestimate the actual physical distances. This is particularly true for subcentimeter measurements. Therefore, obtaining oblique reformatted projections (Fig. 3A) is of paramount importance for accurate measurements.

(A)nterior/posterior

Anterior/posterior descriptor designates whether the tumor is located along the ventral or dorsal aspects of the

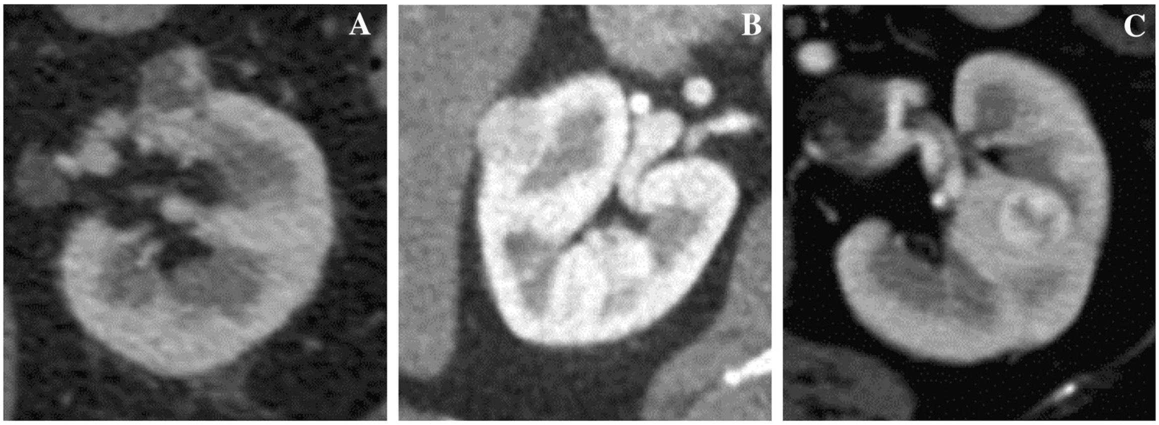

Fig. 2. Nephrometry Score (E)xo/endophytic status is quantitated on a 3-point scale. Tumors that are 50% or more exophytic are assigned 1 point (**A**), tumors that are less than 50% exophytic are assigned 2 points (**B**), while those that are entirely endophytic (encircled 360 degrees by uninvolved renal parenchyma) are assigned 3 points (**C**).

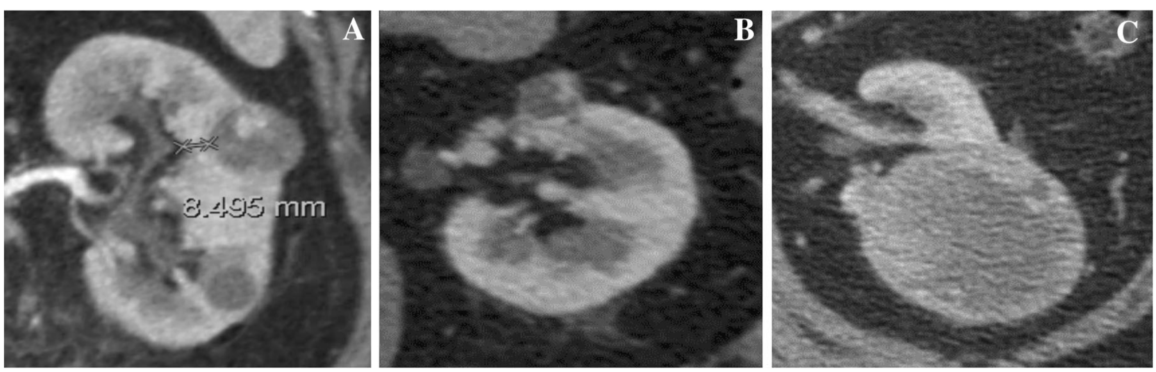

Fig. 3. If distance between the deepest portion of the tumor and the closest sinus fat or collecting system measures 7 mm or greater, 1 point is assigned to the (N) attribute of the tumor. A distance between 4 and 7 mm is assigned 2 points, while tumors that come within 4 mm of the sinus or collecting system on axial images are assigned 3 points.

kidney [5] (Fig. 4). The "a/p" descriptor is determined from axial imaging. If the tumor lies primarily on the ventral surface of the kidney, the anterior (a) descriptor is assigned. Tumors located on the dorsal renal surface are assigned a posterior (p) designation. Tumors that do not fall into one of these categories, such as a purely lateral or a central apical lesion, are assigned the designation "x." The a/p/x suffix is used at the end of the Nephrometry sum (i.e., a 7a tumor denotes a Nephrometry sum of 7 in an anterior location). Although surgical or interventional incision or access point is primarily based on clinicians' preference, which is largely driven by personal preference, knowledge of the tumor location might affect the chosen approach in selected cases. For instance, some surgeons utilize a purely laparoscopic approach, modifying it only by treating anterior lesions trans-peritoneally and posterior lesions retroperitoneally [26, 27]. An alternative strategy is to treat anterior lesions laparoscopically (resection or ablation) and posterior lesions percutaneously [26, 28]. In the meantime, other centers largely avoid laparoscopic focal therapy and perform only percutaneous cryoablations [29, 30].

(L)ocation relative to the polar lines

The upper and lower polar lines are consistent and reproducible landmarks of every kidney, which can be easily and reliably identified on coronal or oblique coronal reformats on the plane of renal sinus (Fig. 5). The polar lines describe two parallel lines tangential to the upper and lower renal cortical lips at the renal hilum. Nonpolar location of solid renal masses has been shown to present a greater challenge during partial nephrectomy [31, 32] (Table 1). One point is given for tumors located below the lower or above the upper polar lines, two points for tumors that cross the polar lines, and three

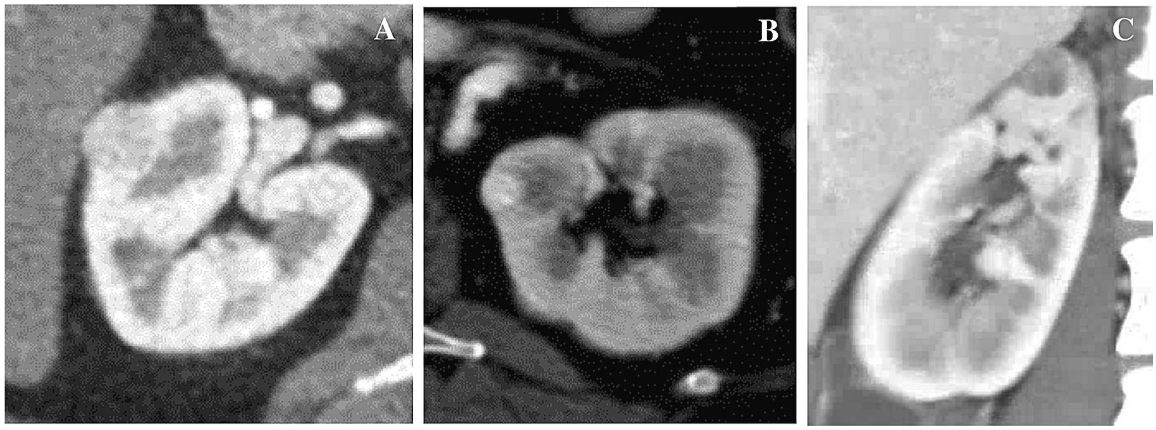

Fig. 4. The letter A is ascribed to tumors that lie primarily anterior to the axial midline (**A**), while the letter P designates those in a more posterior location (**B**). When the mass grows from the tips of the renal poles or arises from the kidney so that a meaningful anterior or posterior designation is not possible, the suffix X is assigned to the tumor (**C**).

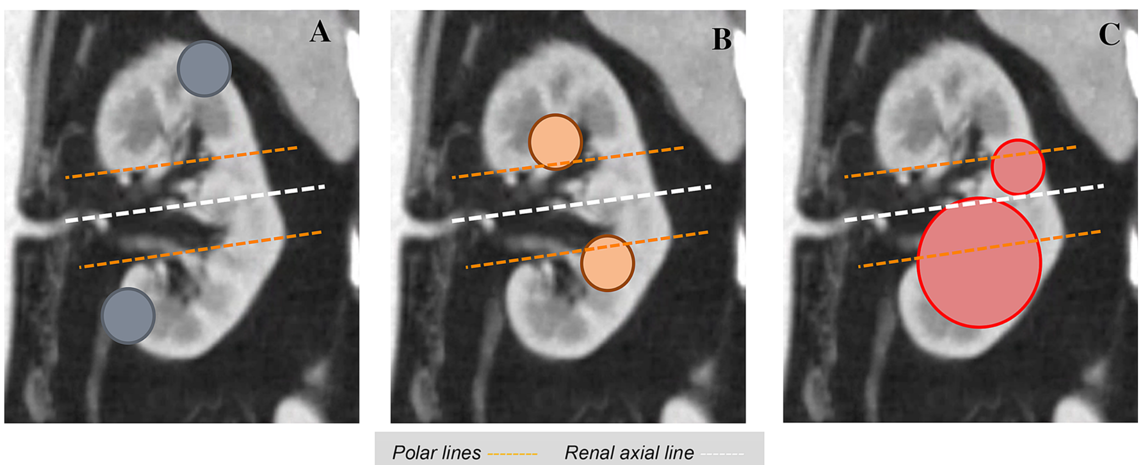

Fig. 5. (**A**) Tumors that are entirely above the upper polar line or below the lower polar line are assigned 1 point for the (L) component (A). (**B**) If the lesion crosses the polar line a score of 2 points is given. (**C**) A tumor that has greater than 50% of the diameter across either polar line, crosses the renal axial midline, or is fully contained between the polar lines is assigned 3 points.

points for tumors with more than 50% of its volume across the polar lines or crossing the mid-axial line.

Percutaneous renal ablation complexity (P-RAC) score

Percutaneous ablation plays a unique and increasingly important role in the management of renal tumors [33]. Several recent studies have applied the nephrometry score retrospectively to index tumors that underwent ablations to determine if the score can predict outcomes. One study failed to correlate the nephrometry score with ablation efficacy and complication rates of percutaneous radiofrequency (RF) and cryoablation [34]. Another study similarly failed to correlate the nephrometry score with RF ablation complications and outcomes [35]. As percutaneous renal ablation procedures become widely used to treat renal cancer, there is a need to implement a similar standardized classification system to precisely gauge the technical complexity of percutaneous ablation procedures.

Mansilla et al. proposed percutaneous renal ablation complexity (P-RAC) scoring system (Table 2) [36], which adopts principles of the nephrometry score, but modifications are made to address its limitations when applied to percutaneous ablations. The P-RAC score consists of 4 numeric scoring features: maximal tumor diameter, distance to the nearest anatomic structure, nearness to the collecting system, and exophytic/endophytic characteristics. A letter "a" or "p" following the numeric score describes the anterior/posterior location. The "Nearness to the collecting system," "Exophytic/endophytic characteristics," and "Anterior/posterior" descriptors are components shared by the nephrostomy score. A 1.5 multiplier is applied to the "distance to the nearest anatomic structure" scoring feature if the structure

Table 2. P-RAC Scoring System [36]

P-RAC scoring features	1 Point	2 Point	3 Point
Radius (cm)	≤ 3	> 3 but < 4	≤ 4
Exophytic/Endophytic characteristics	≥ 50% exophytic	< 50% exophytic	Completely endophytic
Nearness to collecting system/sinus in mm)	≥ 7	> 4 but < 7	≤ 4
Anterior/Posterior	Mass location gets a letter added to the score; "A" for masses anterior to the sinus, "P" posterior, and "X" for not applicable.		
Distance to the nearest structure	> 1.5 cm	> 1 cm but ≤ 1.5 cm	≤ 1 cm
A 1.5 multiplier is applied to this scoring feature for organs of the high-risk category (small bowel, colon, pancreas, ureter, and renal hilar vasculature). The points equal 3 and 4.5 points, respectively*			

P-RAC score consists of 4 numeric scoring features: maximal tumor diameter, distance to the nearest anatomic structure, nearness to the collecting system, and exophytic/endophytic characteristics. A 1.5 multiplier is applied to the "distance to the nearest anatomic structure" scoring feature if the structure adjacent to the renal tumor is an organ with a relatively higher probability of significant morbidity in the event of iatrogenic injury
Asterisk is part of the scoring system

adjacent to the renal tumor is an organ with a relatively higher probability of significant morbidity in the event of iatrogenic injury [36].

The P-RAC score incorporates the "distance to nearest anatomic structure" because the tumor proximity to "high-risk" structures such as small bowel, colon, ureter, pancreas, gallbladder, and renal hilar vasculature has a significant impact on the risk and complexity of percutaneous ablation. For example, use of organ protective hydrodissection was significantly more common in the P-RAC high-complexity category than in the low-complexity category (Fig. 6) [36].

The P-RAC score may be useful in stratifying percutaneous renal ablation complexity. However, further studies with larger sample sizes are necessary to validate the P-RAC score and to determine if it can predict the risk of complications.

Additional pertinent imaging findings (not included in the nephrometry scoring system)

While the Nephrometry score is concerned with the tumor's complexity relative to the kidney, several other pertinent parameters also need to be included in the radiological report for tailored surgical planning. Knowledge of the kidney position, characteristics of the visceral perinephric fat, and the relevant renal arterial anatomy is essential for a preoperative assessment.

Kidney position

The urologist generally uses an extraperitoneal, subcostal, flank incision, whereas anterior abdominal incisions are used for some large upper pole tumors as well as in patients with renal morphological anomalies such as horseshoe kidney and cross fused renal ectopia. The extraperitoneal approach avoids peritoneal contamination and permits earlier return of normal bowel function following surgery [37].

Coronal CT images show the position of the kidney in relation to the lower rib cage, iliac crest, and spine, thereby helping surgeons accurately plan the initial incision. Renal position in addition to location and size of the tumor determines the extent of the incision. By convention, the kidney's position is described relative to the twelfth rib. An imaginary vertical line connecting a mid-point at the lateral cortical border of the kidney to the last rib has been suggested as a rough estimate of the kidney's position (Fig. 7). For example, a high kidney with its lateral mid-point above the twelfth rib is considered a challenge for the posterior extraperitoneal approach.

Perinephric fat

Nephrectomy, total or partial, requires full mobilization of the kidney. Large amounts of perirenal fat make surgery difficult and obscure anatomic landmarks. Studies have reported an association between the surgical time and the amount of perirenal fat present [38]. Radiologists must measure perirenal fat, which can be grossly quantified by measuring its thickness on axial images and alert the urologist if a large amount of fat is present because it can lead to increased surgical complexity and time. Adherent perinephric fat (APF) is another factor known to make partial nephrectomy difficult. Posterior perinephric fat thickness and stranding are highly predictive of APF and must be included in the report (Fig. 8) [39–41].

Renal vessels anatomy

Renal vessels are acknowledged for presenting a wide range of variations. There are three types of renal arteries: hilar, which enter the kidney at the hilum; polar, which enter the kidney at the renal pole; and capsular, which surround the kidney. Seventy-one percent of kidneys have one artery, and 24% have two arteries. Of those with two arteries, 12% contain two hilar arteries,

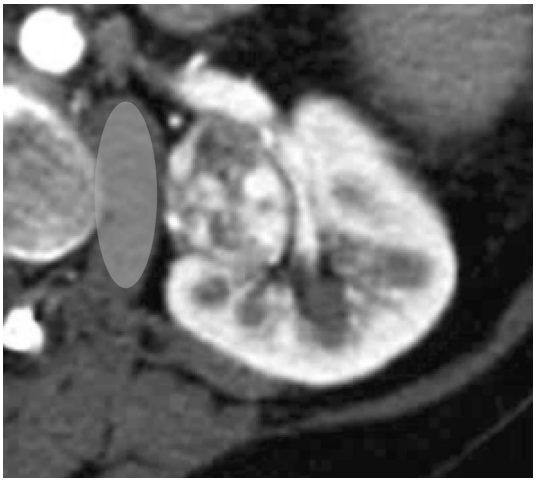

Fig. 6. Ablation of posterior masses located close to major psoas muscle (shaded) can damage the genitofemoral nerve, resulting in chronic pain, and diminished sensitivity within the skin area of the ipsilateral inguinal region. Displacement techniques (e.g., hydrodissection) can be used to lower the risks of nerve injuries.

7% contain one hilar and one superior polar artery, and 5% contain one hilar and one inferior polar artery. Only 5% of kidneys contain three or more renal arteries, which are present in 4% and 1% of kidneys, respectively [42]. Most partial nephrectomies are performed with transient clamping of the main renal artery. Total nephrectomy requires ligation of large draining lumbar veins. As the field of view at laparoscopic surgery is limited, it is essential to meticulously assess the origin, number, division, and course of the renal arteries and veins. Knowledge of the distance of the first arterial branching from the renal sinus and presence of accessory arteries is essential to predict the degree of required perinephric tissue dissection.

Once raw data are acquired, multiplanar reformation (MPR) technique can be employed to process information from axial CT images to create curved planar images, which in turn can be used to provide accurate vascular length and segmental measurements [43, 44] (Fig. 9). Certainly, the notion of renal vascular variant anatomy (Fig. 10), patency, and tumor vascular extension (Fig. 11) is of great significance in staging disease and avoiding intraoperative vascular complications.

Additional considerations

The presence of an extension of tumor into the perirenal fat, the involvement of the pararenal fascia, ipsilateral adrenal gland, regional lymphadenopathy, and distant metastases are important for tumor staging and should be included in the radiology report. Renal parenchymal variant anatomy such as the presence of Dromedary hump, fetal lobulation, a column of Bertin, renal cleft, congenital fusion, or mal-rotation in addition to benign abnormalities such as cysts, stones, calcifications, scars, or angiomyolipomas (AML) should be reported. Evaluation of the contralateral kidney for abnormalities is essential to ensure the postoperative outcome. Choosing RN for a patient with unhealthy and functionally impaired contralateral renal tissue may result in severe renal complications immediately or in the long-term [45].

Suggested reporting template

Davenport et al. survey have shown that radiologists and urologists have different expectations regarding what should be included in a CT or MRI report of an inde-

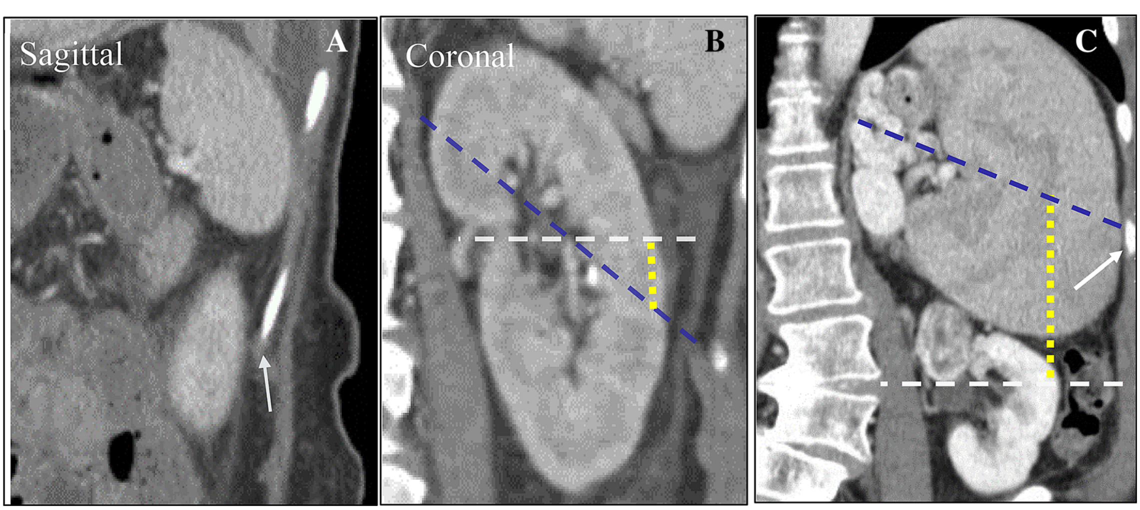

Fig. 7. A vertical line (yellow line) traversing the middle of the lateral cortex (white line) can be used to mark the site of flank incisions. (**A**) 12th rib (Arrow) overlaying the mid lateral cortex. (**B**) Middle of the lateral cortex (white line) lies cephalad to the 12th rib course (blue line). (**C**) Tumor in a low-abdominal kidney; note splenomegaly and levoscoliosis. (*Images from left to right labels A, B, and C respectively*).

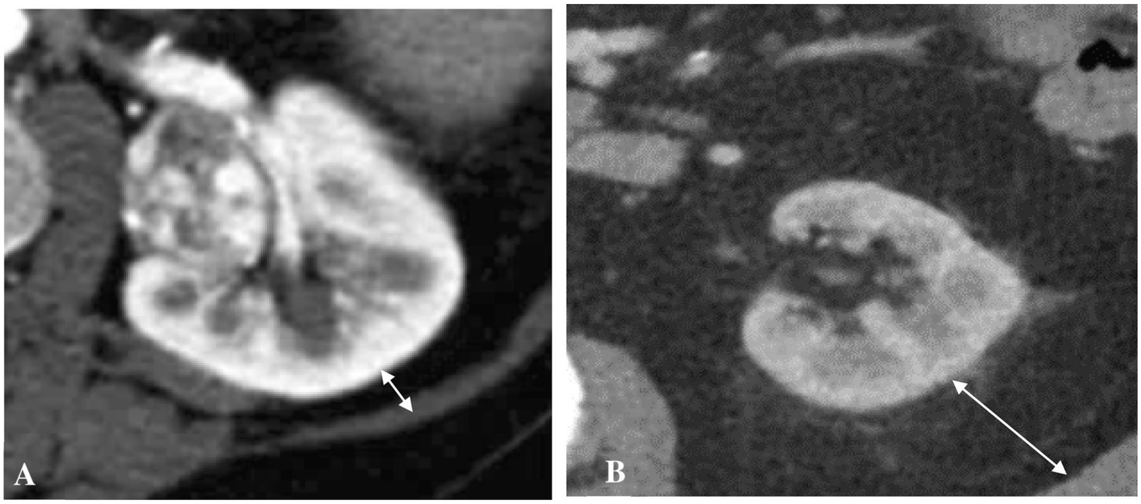

Fig. 8. (**A**) Amount of visceral perinephric fat (white arrows) is a relevant finding which can be associated with perioperative complications, particularly in robotic partial nephrectomies. Perinephric fat stranding (**B**) can predict adhesiveness of renal capsule to the surrounding fat within Gerota's fascia.

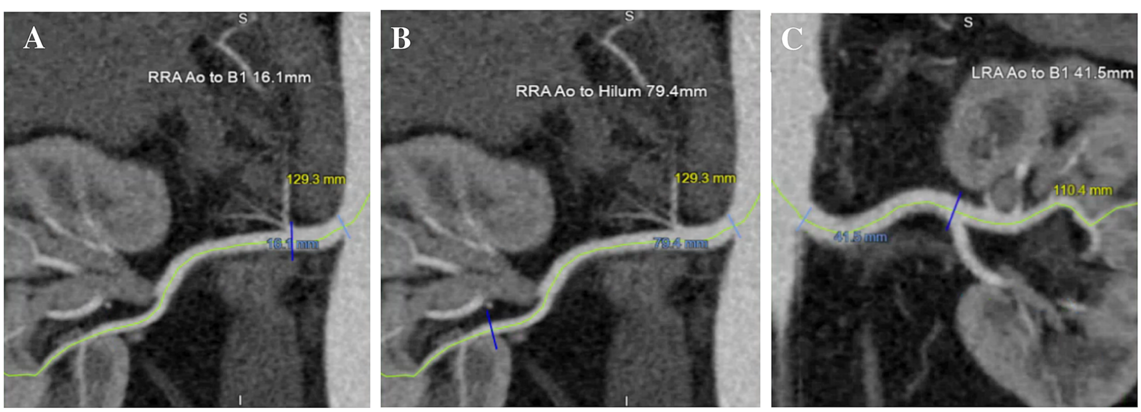

Fig. 9. (**A**) Demonstrates distance between main right renal artery (RRA) to first branching point B1 and (**B**) to the renal hilum. (**C**) Shows similar measurements for the left kidney.

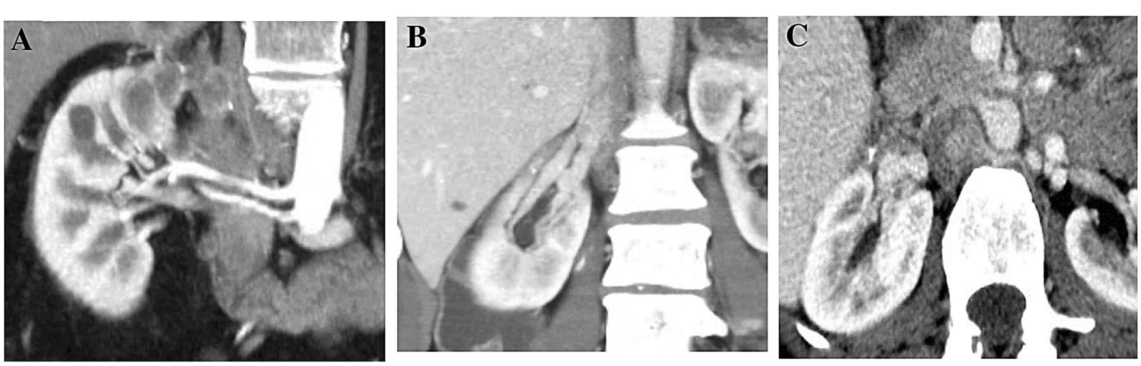

Fig. 10. (**A**) Right renal upper pole tumor with two renal arteries. (**B**) Right renal upper pole tumor with two renal veins. (**C**) Anterocaval right main renal artery.

terminate renal mass. These findings highlighted the need for comprehensive reporting approach with standardized objective and reproducible measures, similar to BI-RADS used in breast imaging and the recently introduced LI-RADS for liver imaging [46, 47]. Here we suggest a structured template, which incorporates the nephrometry score and additional pertinent imaging findings for the reporting of a solid renal mass which is

Fig. 11. Upper pole tumor (**A**) with renal vein bland thrombus (**B**) and perinephric collaterals (**C**).

Involved Kidney:

- **Nephrometry Score**: *Radius []cm; Exophytic/endophytic: [>50%* exophytic*,<50%* exophytic*, endophytic]; Nearness to the collecting system:[>7, 4-7, <4] mm; Anterior/posterior:[A, P, X]; Location: [Upper/lower pole; Cross upper/lower polar line, 50% of mass is across polar line , mass entirely between polar lines, or mass crosses the axial midline]; Extension into renal vein [h, None]. Nephrometry Score*: [(eg, 8A*).*] *
- **Extra-renal structures adjacent to the lesion**: *Distance to the nearest anatomic structure (structures such as small bowel, colon, ureter, pancreas, gallbladder, and renal hilar vasculature. ***
- **Perinephric fat stranding** [*None, Present*]; **Amount of perinephric visceral fat** [*Scant, Abundant*]
- **Extension of tumor into perirenal fat, pararenal fascia or ipsilateral adrenal gland:** [*None, Present*]
- **Kidney location:** [*Standard, high, low, ectopic]*
- **Kidney size**: [] cm
- **Collecting system**: [*Standard, Duplicated*]
- **Vessels:** *Distance of main renal artery origin to the first branch and to renal hilum, respectively: [] and []cm; Accessory renal arteries: [None.]; Length from IVC to [right] renal hilum/ from aortic edge to the [left] renal hilum, respectively: [] and [] cm; Accessory renal veins: [None.]*
- **Parenchymal variant anatomy:** *[Standard, Dromedary hump, Fetal lobulation, Column of Bertin, Renal cleft, congenital fusion / rotation]*
- **Benign pathology:** [*cysts, stones / calcifications, scars, AML]*

Contralateral Kidney:

- **Kidney size**: [] cm
- **Enhancement: [***Normal, Delayed***]**
- **Pathology:** [*cysts, stones / calcifications, scars, AML*]

Other:

- **Regional lymphadenopathy []**
- **Distant Metastases []**

Fig. 12. Suggested CT report template for preoperative interpretation of solid renal masses presumed or proven to represent renal cell carcinoma. *For nephrometry score calculation refer to Table 1 or use online tool www.nephrometry.com. **(P-RAC) Score can also be calculated and included in the report if the patient is being considered for percutaneous ablation (Table 2).

presumed to represent renal cell carcinoma based on imaging findings. Adopting this type of reporting system will serve as a guide to inform the radiologists about what is desired when describing a renal mass, and furthermore may help standardize the clinical reports received by the referring physicians (Fig. 12).

Conclusion

Currently, the nephrometry scoring system has been utilized primarily by urologists for assessment of renal tumors. However, we advocate expanding the nephrometry scoring system (and P-RAC scoring system for pre-ablation cases) to the field of radiology. Interpretation of urologic imaging falls primarily within the scope of radiologists; thus, formal training and greater familiarity with standard imaging practices may contribute to higher reproducibility [48]. Implementing such systems among radiologists has the potential to greatly impact the surgical planning and perioperative management strategy by the urologists and interventionists [9, 49]. Regular participants in a genitourinary (GU) tumor board can vary but typically include urologists, medical oncologists, radiation oncologists, pathologists, and radiologists. The discussion of renal tumor characteristics is commonplace in this setting, and we believe a quantitative system will improve communication and decision making in multidisciplinary settings. Using nephrometry scoring may assist with patient education regarding perioperative expectations and complication risks [9].

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