



Platinum Correspondence

Margin, Ischemia, and Complications (MIC) Score in Partial Nephrectomy: A New System for Evaluating Achievement of Optimal Outcomes in Nephron-sparing Surgery

Complete removal of the primary tumor remains the most relevant outcome of the surgical therapies for renal cell carcinoma. Over the last few decades, however, we have observed a significant increase in the number of nephron-sparing procedures performed with the aim of preserving renal function. From a technical point of view, partial nephrectomy (PN) is a more complex procedure than radical nephrectomy and has a higher risk of complications [1]. Moreover, new approaches, such as traditional laparoscopic PN and robot-assisted PN (RAPN), were proposed in the last 10 yr as alternative, less-invasive procedures to open PN. In this context, standardizing the reporting of PN outcomes is of paramount importance for evaluating and comparing the efficacy of different approaches.

Evaluating the surgical margins of the specimen after PN is the best way to determine whether the primary tumor was completely removed. Usually, positive surgical margin

(PSM) is defined as cancer cells at the level of the inked parenchymal excision surface [2].

More controversial is the method and timing of evaluating postprocedure renal function. Renal function impairment after PN can be due to multiple patient- or surgery-related factors. The most important surgical variable that influences renal function is ischemia time [3]. Indeed, this variable is still considered one of the most relevant intraoperative outcomes used to compare the results of different series and approaches. The most common method used to induce ischemia is clamping the renal artery with or without the renal vein for a period of time (ie, warm ischemia time [WIT]). Although every minute counts when the renal hilum is clamped, and WIT should be considered more appropriately as a continuous variable, data from the literature suggest that a safe WIT range is between 20 and 30 min [3]. Therefore, having a WIT <20 min can be considered a good clinical cut-off value [4].

Last, the safety profile of PN was recently evaluated using the modified Clavien-Dindo classification, allowing us to identify major postoperative complications by treatment [5].

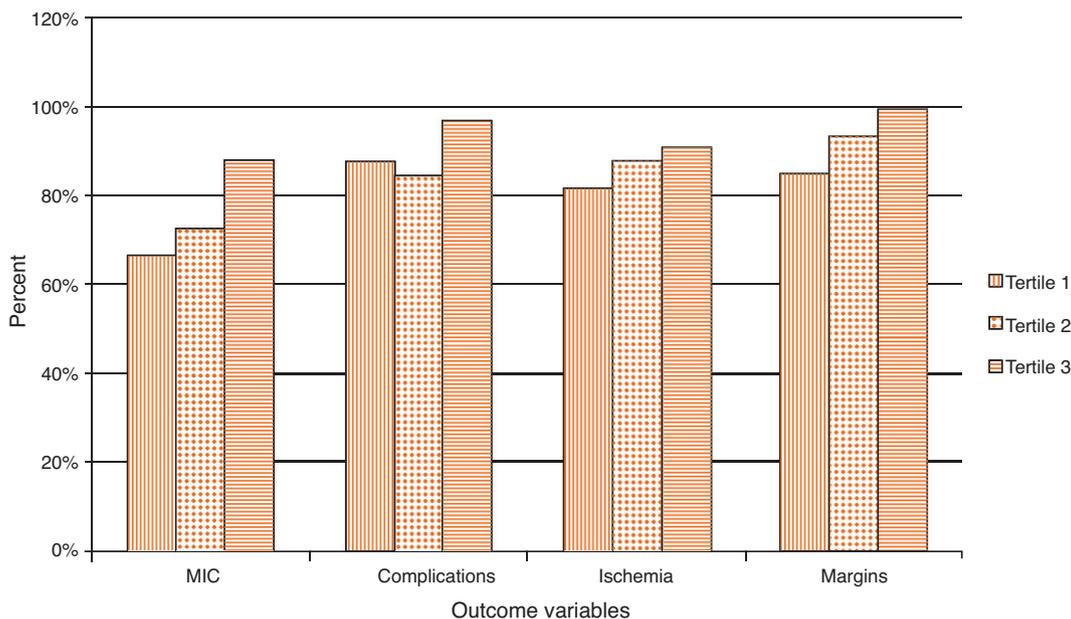


Fig. 1 – Overall margin, ischemia, and complications (MIC) rates by tertile and overall rates of separate outcome variables by tertile.

Taking into account these three variables, we propose to combine them in a new *margin, ischemia, and complications* (MIC) binary system with the aim of identifying patients with the best outcomes after PN procedures. According to the new system, the goal of PN is reached when (1) surgical margins are negative, (2) WIT is <20 min, and (3) no major complications (grade 3–4 according to Clavien classification) are observed.

The application of this system could generate some issues. First, some authors use zero-ischemia or nonclamping techniques. In this case, the second goal of the system will be reached by definition. Second, the MIC rate could be influenced by the different anatomic and topographic characteristics of the treated tumor. More complex tumors should have a lower MIC rate than less complex ones. For this reason, we suggest stratifying the MIC rates according to the PADUA or RENAL nephrometry risk-group categories [6,7].

In a preliminary analysis, we evaluated 99 consecutive patients who underwent RAPN for cT1a/cT1b renal tumors at our tertiary-care high-volume center between March 2008 and January 2012. In our population, the overall number (percentage) of PSMs, patients with <20 min of ischemia time, and complications were 7 (7%), 16 (16.6%), and 10 (10%), respectively. MIC rate was 75.8%. This proportion gradually increased with surgical experience from 66.7% to 87.9% in the last tertile of patients (Fig. 1). The mean pre- and postoperative estimated glomerular filtration rates were 95.04 ml/min (range: 34.9–185.4 ml/min) and 99.03 ml/min (range: 45.1–197.7 ml/min), respectively ($p = 0.2$).

We reported our preliminary findings showing that, besides surgeon experience, tumor size and location appear to have an important impact on MIC, as increasing tumor dimension is significantly related to a decrease in MIC achievement. In light of this, using the PADUA score might allow an adequate postoperative assessment of outcomes.

In conclusion, the MIC system could be easily adopted to standardize evaluation of PN outcomes in patients with renal tumors. This system could further improve the comparison of results from different series and of different surgical approaches. Prospective evaluation in larger series may define more exactly the potential role of the MIC score after PN.

Conflicts of interest: The authors have nothing to disclose.

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Editorial Comment on: Margin, Ischemia, and Complications (MIC) Score in Partial Nephrectomy: A New System for Evaluating Achievement of Optimal Outcomes in Nephron-sparing Surgery. *Eur Urol* 2012;62:617–8

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In this issue of *European Urology*, Buffi et al. propose a new system, the Margin, Ischemia, and Complications (MIC) score, combining margin status of the tumor, ischemia time, and presence of perioperative complications to identify patients reaching the best early results

after partial nephrectomy (PN), regardless the approach used [1]. According to the MIC system, success is reached when surgical margins are negative, the warm ischemia time is <20 min, and no major complications (grade 3–4 according to the Clavien classification) are observed. This system seems simple to use, and the proposed outcomes are strongly supported by the data coming from the most recent data published in the literature.

The use of this standardized system could be of paramount importance to evaluate and compare more appropriately the early results of different approaches (open, laparoscopic, and robotic) and surgical techniques (no clamping, early unclamping, zero ischemia) currently used to perform PN. The possibility of stratifying MIC scores according to the available nephrometry risk-group