

## **Trend of Nephrectomy for Renal Malignancy 2007–2010 in Japan and Factors Affecting Minimally Invasive Surgery from a Nationwide Database**

**Introduction and Objective:** To reveal the trend of nephrectomy and to analyze factors affecting choices of minimally invasive surgery for renal malignancy in Japan.

**Materials and Methods:** We identified patients undergoing open, laparoscopic or minimum incision endoscopic surgery (MIES) nephrectomy for renal malignancy from the Diagnosis Procedure Combination database between July and December, 2007–2010. Data included demographics, comorbidities, performance status, TNM classification, type of hospital, hospital volume and located region. Multivariate logistic regression analysis was performed to reveal the factors affecting choices of minimally invasive surgery (laparoscopy or MIES). A nomogram based on the result was built with an internal validation by bootstrapping with 1000 resamples.

**Results:** There were 14 950 patients (8646 open (57.8%), 5 923 laparoscopic (39.6%) and 381 MIES (2.5%) nephrectomy) from 785 hospitals included. Proportion of open nephrectomy decreased from 65.3% in 2007 to 51.6% in 2010. Laparoscopic nephrectomy accounted for 51.0% of T1 tumors. Multivariate analysis showed minimally invasive nephrectomy was significantly likely performed for patients in their 30-50s (OR of 60s, 70s and  $\geq 80$ ; 0.90, 0.88 and 0.86 reference to 30-50s, respectively) with low Charlson comorbidity index (OR of 1-2 and  $\geq 3$ ; 0.84 and 0.68 reference to 0, respectively), good performance status (OR of performance status  $\geq 1$ , 0.72 reference to 0) and low TNM stage (OR of T2,  $\geq N1$ , M1; 0.27, 0.37 and 0.74 reference to T1, N0 and M0, respectively) who were hospitalized at high-volume (OR, 3.21 reference to low-volume) and/or academic hospitals (OR, 1.31 reference to non-academic) located in western Japan. Hemodialysis use was also a favorable factor (OR, 1.65 reference to non-user). Nomogram was built and the concordance index of the nomogram was 0.722.

**Conclusions:** Gradually laparoscopic and MIES nephrectomy took the place of open nephrectomy especially in T1 tumors and was more likely selected for patients with early tumor stage and low risk.