Evaluation of the impact of renal tumors committee at CMN Siglo XXI, Oncology Hospital

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Abstract

Background and objective: Assess changes in disease management and the treatment of renal cancer after the implementation of improvement initiatives, particularly from the Renal Tumor Board at the Oncology hospital at Centro Médico Nacional (CMN) Siglo XXI. **Material and methods:** Observational and retrospective study over a sample of kidney cancer patients at CMN Siglo XXI. KPI (Key Performance Indicators) were selected to measure time, efficiency, and compliance level in patient journey key processes. **Results:** A database was created with information of 741 patients with variables obtained from different therapeutic areas. After 5 months of the Renal Tumor board implementation, results showed an average compliance level of 37% in the KPIs assessed. After 2 years of the Renal Tumor Board implementation, results showed a compliance level of 47% in KPIs assessed. **Conclusions:** Implementation of initiatives resulted in better kidney patient management and care at the Oncology Hospital at CMN Siglo XXI. Particularly, improvements in waiting time from reference to treatment initiation was observed.

Key words: Kidney cancer. Kidney tumor boards. Oncology Hospital IMSS Siglo XXI. Multidisciplinary team.

Evaluación del impacto del comité de tumores renales en el Hospital de Oncología del CMN Siglo XXI

Resumen

Introducción y objetivo: Medir el impacto en la gestión del tratamiento del cáncer renal a partir de la implementación de acciones, incluyendo el comité de tumores renales, en el Hospital de Oncología del Centro Médico Nacional (CMN) Siglo XXI. **Material y métodos:** Estudio observacional retrospectivo sobre una muestra de pacientes con cáncer renal en la Unidad Médica de Alta Especialidad (UMAE), Hospital de Oncología del CMN Siglo XXI. Se seleccionaron indicadores de gestión para medir tiempo, eficiencia y nivel de cumplimiento de procesos clave en el flujo de un paciente con cáncer renal. **Resultados:** Se creó una base de datos con información de 741 pacientes con variables de distintas áreas terapéuticas. Tras 5 meses, se estimó un cumplimiento promedio de 37% en los indicadores evaluados. Tras 2 años, un cumplimiento del 47%. **Conclusiones:** La implementación de

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las acciones resultó en mejoras en la gestión y atención de pacientes con cáncer renal en la UMAE, Hospital de Oncología del CMN Siglo XXI, particularmente en el tiempo promedio entre referencia e inicio del tratamiento.

Palabras claves: Cáncer renal. Comité de tumores renales. Hospital de Oncología IMSS Siglo XXI. Multidisciplinario.

Introduction

Cancer is characterized by its high associated mortality. For example, in the United States, in 2018, it was estimated that, for every three new cancer diagnoses, there will be one death from this cause¹, which makes it the world's leading cause of death¹. In Mexico, around 4,500 people are estimated to develop kidney cancer every year, ranking 15th in terms of incidence². However, in terms of mortality, kidney cancer ranks 12th in the country², which indicates that, on average, its mortality is higher than that of other cancers with higher incidence.

The use of multidisciplinary tumor boards has been established worldwide as a standard for cancer treatment, which has improved diagnosis, treatment selection, results and possibly overall patient survival³. Currently, and according to the UK National Health Service (NHS), the standard for cancer management is that all patients should be treated by a multidisciplinary team⁴. In particular, the impact of multidisciplinary teams has been demonstrated, with a study where 65 % of these patients were observed to have a change in their diagnosis and treatment standing out⁵.

In this context, a study was carried out at Siglo XXI National Medical Center (CMN – *Centro Médico Nacional*) High Specialty Medical Unit (UMAE – *Unidad Médica de Alta Especialidad*) Oncology Hospital about the management of patients with kidney cancer, where the flow of patients and the barriers that hindered the flow of the patient from referral to hospital admission, treatment initiation, and his evolution were mapped. Adjustments were made in processes in order to optimize waiting times from referral to treatment initiation, and areas of opportunity were identified.

In addition, the Renal Tumor Board was implemented in order to carry out a multidisciplinary evaluation of the treatment choice for patients diagnosed with kidney cancer.

The general purpose of this study is to evaluate the impact of the implementation of management improvements in patients with kidney cancer at CMN Siglo XXI. Other objectives of the study are to evaluate the change in waiting times of patients with kidney cancer at CMN Siglo XXI, evaluate the quality of disease management as measured by management indicators five months after the Renal Tumor Board implementation and two years after the first evaluation.

To assess said objectives, the following null hypothesis has been established: the proposed improvements and the Renal Tumor Board implementation for the management of renal cancer did not have a positive impact on the time to receive care, or on the indicators of quality in the management of the disease. In turn, the following alternative hypothesis has been established: implementation of proposed improvements and the Renal Tumor Board had a positive impact on care times or on indicators of cancer patient quality of care.

Methodology and materials

To carry out the study, average time in the flow of a patient and the level of compliance with management indicators were defined as dependent variables. For independent variables, kidney cancer management variables such as diagnostic workup, date of processes and studies, repeated studies, diagnosis and stage, among others, were defined.

An observational, descriptive, prospective, cross-sectional study was carried out. Through interviews with the personnel involved in the management of kidney cancer at CMN Siglo XXI, and with information recorded in databases by different medical areas, the key processes followed by a patient who is referred from a primary or secondary care hospital were characterized, and total time required between these processes was identified. The usual process followed by a patient with kidney cancer once he is referred to CMN Siglo XXI is depicted in [figure 1](#), and does not depend on the stage of the patient at diagnosis. Subsequently, a Renal Tumor Board was implemented for multidisciplinary evaluation and follow-up of patients, as well as actions to optimize patient management and reduce process times.

Based on the experience of the board members and a literature review⁶⁻¹⁰ and the identified patient flow,¹³ quality indicators were defined in order to measure current situation and the impact of the Renal Tumor Board on the management of kidney cancer. Said indicators were divided into four categories: diagnosis and referral, Renal Tumor Board, surgical treatment and systemic treatment.

For each indicator, a target value was established as a quality standard and the difference between the achieved

Figure 1. Usual process of patients referred to CMN Siglo XXI.
CMN (*Centro Médico Nacional*): National Medical Center.

result and the target was analyzed. These indicators were evaluated in two time horizons: in August 2015, which corresponds to five months after the implementation of the Renal Tumor Board, and in July 2017, which corresponds to two years after the first evaluation.

After the first evaluation of indicators, recommendations for increasing their level of compliance were identified. Indicator evaluation was carried out using a database compiled from different databases independently administered by residents of the following therapeutic areas: urology, radiology, pathology and medical oncology. The database that was in charge of the urology area had 824 registries, while the other areas had 794 registries in their databases.

For the sample selection, the consolidated database of the different medical areas involved was used; it had 53 variables, which were grouped into six categories: CMN Siglo XXI medical records, patient history, patient data (with personal or identification data being omitted), diagnosis, treatment and follow-up. The inclusion criterion was defined as: patients with kidney cancer with records in the database completed by the urology, radiology, pathology and medical oncology medical areas from August 2015 on. The exclusion criterion was defined as: patients without complete records in the database or registration prior to 2015. There were complete patient information records in 741 cases, which were used in the final analysis. Currently, this database has more than 2,000 records.

Finally, those indicators that had a direct impact on survival and whose analysis was valid were identified and were used to indirectly and qualitatively estimate the impact on survival resulting from improvement actions.

Through interviews and review of records in databases, the time a patient spent from being admitted to the hospital to the start of his treatment was calculated,

considering laboratory times and consultations with different medical areas.

Thirteen indicators were defined, whose level of compliance was calculated as the percentage of patients that were eligible for some optimal management criterion. Each indicator thus results in a level between 0 and 100%, which is compared against a defined standard. The impact of the Renal Tumor Board was assessed by comparing the level of compliance in both evaluations of indicators.

Results

Through the interviews, the key processes in patient flow were identified, outlining the process from referral to monitoring. In addition, the main barriers to the management of the disease were identified (Fig. 2).

Waiting times evaluation was carried out based on the interviews and using the databases administered by the medical areas. The time from patient admission to preliminary consultation and the time between the request to control tower and supply of the medication was estimated, as well as the time between preliminary consultation and evaluation by the Renal Tumor Board, and the time between this and appointment with the medical oncology area. The result of the first evaluation, which was initiated in December 2014, was that a patient takes between 100 and 125 days to go through these processes; assuming a normal distribution in average time per patient and a 95% confidence interval, this represents a mean of 112 days with a standard deviation of 6.25 (Fig. 3).

As a result of this evaluation, improvement actions were proposed such as increasing the availability of

Figure 2. Flow of kidney cancer patients at Siglo XXI National Medical Center with identified problems. HR: human resources.

Figure 3. Times and change in the flow of kidney cancer patients referred to CMN Siglo XXI. CMN (*Centro Médico Nacional*): National Medical Center; MO: medical oncology.

diagnostic tests such as X-rays, ultrasound, magnetic resonance imaging, computed tomography (CT) and positron-emission tomography/computed tomography.

In addition, implementation of a Renal Tumor Board, made up of the medical areas of urology, radiology, chemotherapy, medical oncology, pathology, surgeons and

Table 1. Selected indicators for measuring the quality of health care by category

Reference and diagnosis	Renal Tumor Board	Surgical treatment	Systemic treatment
1. Patients with complete diagnostic workup	7. Time from referral to admission to the Board	10. Time to pass to surgery	12. Number of patients with systemic treatment
2. Time for performing diagnostic workup	8. Number of cases that pass through the Board	11. Number of nephron-sparing surgeries	13. Time to systemic treatment initiation
3. Repetition of CT-scans carried out outside CMN Siglo XXI	9. Complete medical record		
4. Histological evaluation of all cases			
5. Performance of studies to establish markers			
6. Tumor TNM classification			

CMN (*Centro Médico Nacional*): National Medical Center.

other specific areas by case, e.g., social services, was proposed.

The Renal Tumor Board would speed up the flow of a patient who is referred, since at the moment of being admitted to CMN Siglo XXI, patients' medical record would be sealed and directly submitted to the Renal Tumor Board, where a multidisciplinary evaluation of the case would be carried out on a weekly basis for treatment plan design and diagnostic tests prescription. This change reduces care times by eliminating the need for the patient to attend multiple medical appointments as he was previously required, as shown in [figure 3](#).

The Renal Tumor Board has a weekly session of four to six hours to review all atypical or complicated cases for treatment decision-making, validation of previously recommended treatments, and academic and clinical evaluation of cases.

In addition, the Renal Tumor Board was assigned medical imaging, laboratory and operating room priority spaces, thus reducing patient waiting times to a greater extent. In addition, this implies a change in patient management, since waiting times and potential loss of information resulting from multiple appointments are avoided.

These actions began to be implemented in March 2015 and were evaluated in August of that year. In the waiting times new evaluation, no process was observed to exceed three weeks, which implied a reduction on average care time to 65 days, i.e., a reduction of approximately 42 % on average time from referral to treatment, which represents a mean that is 10 standard deviations lower ($p < 0.0000$) ([Fig. 3](#)).

Figure 4. Number of variables included in the database by category.

CMN (*Centro Médico Nacional*): National Medical Center.

In addition to evaluating waiting times, based on international literature and in consensus with CMN Siglo XXI, 13 medical care quality indicators were proposed. The indicators were to be evaluated with the databases of involved areas. The four indicator categories are: referral and diagnosis, Renal Tumor Board, surgical treatment, and systemic treatment ([Table 1](#))⁶⁻¹⁰. All 13 indicators were evaluated with the information recorded in the databases of each medical area, the combination of which yielded 51 available variables ([Table 2](#)). Descriptively, these variables were grouped into six categories: CMN Siglo XXI medical records, patient history, patient data, diagnosis, treatment, and follow-up; the category with the highest number of variables was that related to CMN Siglo XXI medical records ([Fig. 4](#)). Each

Table 2. Variables available in databases

Gender	Hemoglobin	Recurrence	Clinical stage	Date of surgery performance	Did the patient have a bone scan?
Age	CA (cancer antigen)	Recurrence diagnosis	Tumor biopsy	Surgery opportunity	Did the patient have a nuclear renal scan?
ECOG (Eastern Co-operative Group scale)	Lactate dehydrogenase	Recurrence site	Date of biopsy reception	Was nephron-sparing surgery performed?	Did the patient have a nuclear heart scan?
Referral diagnosis	Creatinine	Board date	Biopsy report date	CT-scan from another unit	Did the patient have a PET-scan?
Referral date	Metastatic disease	Medical oncology first-time appointment	Nephrectomy	Was CT-scan performed in the hospital?	Did the patient have a MRI?
Preliminary consultation date	Metastatic site	Medical oncology opportunity	Nephrectomy reception date	Was CT-scan repeated?	Did the patient have a simple chest X-ray
Opportunity	Plan	Control tower request procedure	Nephrectomy report date	Ultrasound from another unit	Others?
Diagnosis	Nephrectomy date	Control tower authorization	Complete medical record	Was ultrasound performed in the hospital?	Type of nephrectomy
Tower opportunity	Surgery scheduling date	Was ultrasound repeated?			

CT: computed tomography; PET: positron-emission tomography; MRI: magnetic resonance imaging.

Table 3. Indicators definition and technical description example. Indicator 1

Indicator name	Indicator 1: referred patients' complete diagnostic workup	
Rationale	Complete diagnostic workup and CT-scan are essential for the patient to be correctly diagnosed, and having a better rate of patients previously evaluated at the hospital they come from speeds up the diagnostic and treatment process	
Formula	Numerator	Denominator (target population)
	Patients referred from other hospitals with CT-scan and complete diagnostic workup	
Description	Every patient who arrives at the hospital must pass through preliminary consultation in which compliance with CT-scan and the necessary diagnostic workup for a definitive kidney cancer diagnosis will be verified and recorded	
Explanation of terms	<ul style="list-style-type: none"> – Imaging studies: CT-scan, PET-scan, MRI, simple chest X-ray – Histopathological study: biopsy – Complementary laboratory tests: urinalysis, complete blood count, comprehensive metabolic panel 	
Standard	100%	

CT: computed tomography; PET: positron-emission tomography; MRI: magnetic resonance imaging.

indicator evaluates a kidney cancer optimal management characteristic. [Table 3](#) shows more precisely an example of the elements and explanations that define each indicator.

In the first evaluation of indicators, carried out in August 2015, the information required to calculate four indicators was not available. In the remaining nine indicators, an average compliance of 37% was estimated, with a range from 0 to 100% ([Table 4](#)).

In addition, this evaluation sought to describe the barriers whereby the desired level of compliance was not reached in order to identify preliminary recommendations to be discussed in the review session and to be subsequently implemented. The following nine actions for focusing efforts on improvement actions to be implemented within the hospital were identified: requirement of a new CT scanner for the institution; identification of referring centers that send patients with CT scans that are not assessable for the case or with errors; identification of immunohistochemical studies required by the center for inclusion in the essential procedures list; inclusion to the board of the head of the medical records department in order to promote the complete medical record indicator; identification of referring centers that send patients

Table 4. Results of the first measurement of indicators

Indicator	Description	Measurement result	Goal
Indicator 1	Referred patients' complete diagnostic workup	10%	100%
Indicator 2	Time to complete diagnostic workup lower than 15 days	No diagnostic workup performance date	100%
Indicator 3	Repetition of CT-scans carried out outside CMN Siglo XXI	23%	< 10%
Indicator 4	Histological evaluation of all cases	Baseline status not reported	100%
Indicator 5	Immunohistochemistry study performance for establishing markers	Specific records for this study not available	100%
Indicator 6	Tumor TNM classification	98%	100%
Indicator 7	Time from reference to Board admission	15%	100%
Indicator 8	Number of kidney cancer cases that pass through the Board	100%	> 90%
Indicator 9	Complete medical record	18%	100%
Indicator 10	Time to pass to surgery	0%	100%
Indicator 11	Number of nephron-sparing surgeries	16%	Not reported
Indicator 12	Number of patients with systemic treatment	Not reported	Not reported
Indicator 13	Time to systemic treatment initiation	0%	100%

CMN (*Centro Médico Nacional*); National Medical Center.

who are candidates for nephron-sparing surgery; development of guidelines to identify patients who are candidates for nephron-sparing surgery; publication of the results obtained by the Board upon reaching 200 reviewed cases; demonstration of the drug supply problem to the Mexican Institute of Social Security (IMSS – *Instituto Mexicano del Seguro Social*); development of a patient discharge form identifying the characteristics of patients who are referred to palliative care.

Subsequently, in July 2017, the second indicator evaluation was carried out, which had the necessary information to calculate 9 of 13 indicators. Out of these, 7 were also evaluated on the first occasion, i.e., 7 (53%) had information on both evaluations.

The reasons whereby some indicators could not be measured were due to inaccurate or missing information. For example, whether there were patients with a medical record but were not evaluated by the Board was not specified, or the Board evaluation date was omitted, and if the referral date was assumed as the evaluation date, it would result in surgeries prior to evaluation. The lack of sufficient information to calculate the level of compliance with indicators is mainly

due to the fact that the information originated from different databases independently fed by each medical area.

In the second evaluation of indicators, seven of the nine evaluated indicators were found to have improvements, including the two indicators that were not evaluated on the first occasion. The indicators where the level of compliance showed increases were 1, 3, 7, 9 and 13, which refer to patients with complete diagnostic workup, repeated CT-scans, time to admission to the Tumor Board, complete medical records and systemic treatment timely initiation, respectively. The indicators in which the level of compliance was reduced are 6 and 11, which refer to tumor TNM classification and number of nephron-sparing surgeries, with the latter being an informative indicator whose objective value will depend on clinical conditions and cannot be established beforehand (Table 5).

Although the goal was not reached in the indicators that improved, the progress of some of them was considerable, with some that went from 15 to 90% or from 10 to 63%, which resulted in an increase in indicator compliance average level from 37 to 47%.

Table 5. Results of the second evaluation of indicators and comparison against the first one and goal

Indicator	Description	First evaluation (August 2015)	Second evaluation (July 2017)	Goal
Indicator 1	Referred patients' complete diagnostic workup	10%	63%	100%
Indicator 2	Time to complete diagnostic workup lower than 15 days	NA	NA	100%
Indicator 3	Repetition of CT-scans carried out outside CMN Siglo XXI	77%	84%	100%
Indicator 4	Histological evaluation of all cases	NA	15%	100%
Indicator 5	Immunohistochemistry study performance for establishing markers	NA	NA	100%
Indicator 6	Tumor TNM classification	98%	89%	100%
Indicator 7	Time from reference to Board admission	15%	90%	100%
Indicator 8	Number of kidney cancer cases that pass through the Board	100%	NA	90%
Indicator 9	Complete medical record	18%	50%	100%
Indicator 10	Time to pass to surgery	0%	NA	100%
Indicator 11	Number of nephron-sparing surgeries	16%	4%	NA
Indicator 12	Number of patients with systemic treatment	NA	6%	NA
Indicator 13	Time to systemic treatment initiation	0%	19%	100%

CMN (*Centro Médico Nacional*); National Medical Center; NA: not available.

CMN Siglo XXI kidney cancer patient management radically changed by integrating, aligning and prioritizing all human efforts and resources throughout the needs of the kidney cancer patient. At the closure of this study, more than 2,000 patients had been favored by these changes in the management of their disease: with more agile processes, avoiding redundancy, enriching the therapeutic discussion, etc. The establishment of management indicators for a cancer department at IMSS CMN Siglo XXI UMAE Oncology Hospital, and measurement, evaluation and publication of its results, is a milestone in the country's oncology.

The improvements that were obtained were substantial and were the result of actions identified based on patient flow evaluation and implementation of a system of management quality indicators. The first improvement in patient management, obtained five months after the initiatives were implemented, is a 51-day reduction in the time from referral to treatment initiation. The second improvement that was observed, approximately two years after the first evaluation of indicators, was an increase in indicators' compliance

average level, from 37% to 47%, relatively improving the management of kidney cancer at CMN Siglo XXI by 27%.

Discussion

According to recommendations in the literature, a Renal Tumor Board was implemented in order to improve patient care at CMN Siglo XXI. In addition, a system of indicators was implemented to evaluate the change in the management of the disease, but it does not allow isolating the impact of the Renal Tumor Board from the impact of other interventions carried out at the center, such as increasing diagnostic tests availability, which is why considering the isolation of these impacts in future studies is suggested.

The analyzed indicators are still below the values established by international standards⁶; however, the results show a relative improvement of 27% in the management of patients with kidney cancer at CMN Siglo XXI, which is why an invitation is made to replicate this initiative at the national level and in different

oncological pathologies in order to improve the quality of patient care in a more generalized way.

Regarding survival, it is inferred that this progress in the management of kidney cancer resulted in an improvement in patient survival, since they are receiving treatment in a shorter time since referral, and medical decisions are being made by a multidisciplinary team with more complete diagnostic workup and medical records, which results, in general, in more timely and precise treatments; however, carrying out another study with a patient follow-up that allows the specific impact of the intervention on patient survival to be determined is recommended. Another important limitation of the study is that the quality of medical care was evaluated using databases independently kept by all involved areas, exclusively in one center, which affected the quality of the information and, in certain cases, prevents drawing conclusions on the impact of the Renal Tumor Board and the implemented improvements. In addition, inconsistencies were found in the databases, which limit the real impact of the implemented improvements. Finally, it is suggested that future studies should analyze the impact of patient transit prior to being referred to tertiary care hospitals, since this may affect the studied indicators.

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Conflicts of interest

The authors declare that they have no conflicts of interest.

Ethical disclosures

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this research.

Confidentiality of data. The authors declare that they have followed the protocols of their work center on the publication of patient data.

Right to privacy and informed consent. The authors have obtained informed consent from the patients and/or subjects referred to in the article. This document is in the possession of the corresponding author.

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