

# Assessment of quality indicators in pediatric major outpatient surgery. Influence of the COVID-19 pandemic

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## ABSTRACT

**Introduction.** Major Outpatient Surgery (MOS) is an organizational and management model for surgical care that allows selected patients to be treated efficiently and safely. Our objective was to evaluate the quality of the different activities through standardized quality indicators, analyzing whether they have been modified during the COVID-19 pandemic.

**Materials and methods.** An observational and comparative descriptive study of the quality indicators (QI) of MOS in our Pediatric Surgery Department from 2019 to 2020 was carried out. In accordance with the International Association for Ambulatory Surgery (IAAS) and the recommendations of the Spanish Ministry of Health and Consumer Affairs, we assessed the basic quality and the degree of family satisfaction of patients undergoing MOS.

**Results.** A total of 848 and 652 interventions were performed in 2019 and 2020, respectively, with a mean age of 6 and 7 years. 539 (ambulatory rate (AR) 63.6%) and 465 (AR 71.3%) MOS surgeries were conducted in 2019 and 2020. In 2019, the overall substitution rate (SR) was 96.8%, hospitalization rate (HR) was 1.67%, suspension rate was 5.94%, and readmission rate was 1.48%. In 2020, the overall IS was 98.3%, HR was 0.86%, suspension rate was 4.73%, and readmission rate was 1.72%. No differences were found in terms of satisfaction between 2020 and 2019.

**Conclusions.** QI allow us to know and analyze the performance and results of the different management units. In our department, the COVID-19 pandemic has not reduced the quality of CMA care.

**KEY WORDS:** Major Ambulatory Surgery (MOS); Pediatric surgery; Quality indicators; COVID-19.

## EVALUACIÓN DE LOS INDICADORES DE CALIDAD EN CIRUGÍA MAYOR AMBULATORIA PEDIÁTRICA. INFLUENCIA DE LA PANDEMIA POR COVID-19

### RESUMEN

**Introducción.** La cirugía mayor ambulatoria (CMA) es un modelo de gestión de asistencia quirúrgica que permite tratar de forma eficiente y segura a pacientes seleccionados. Nuestro objetivo es evaluar la calidad de esta actividad a través de indicadores de calidad estandarizados, analizando si se han visto modificados durante la pandemia por COVID-19.

**Material y métodos.** Estudio descriptivo observacional y comparativo entre 2019 y 2020 de los indicadores de calidad (IC) de CMA de nuestra unidad de Cirugía Pediátrica. De acuerdo con la *International Association for Ambulatory Surgery* (IAAS) y las recomendaciones del Ministerio de Sanidad y Consumo, valoramos los indicadores de calidad básicos para CMA, así como el grado de satisfacción de las familias de pacientes intervenidos en este régimen.

**Resultados.** En total 848 y 652 intervenciones realizadas en 2019 y 2020, respectivamente, con edad media de 6 y 7 años. 539 (índice de ambulatorización (IA) 63,6%) y 465 (IA 71,3%) cirugías en régimen de CMA en 2019 y 2020. En 2019, índice de sustitución (IS) global 96,8%, índice de hospitalización (IH) 1,67%, índice de suspensión 5,94% e índice de reingreso 1,48%. En el año 2020, IS global 98,3%, IH 0,86%, índice de suspensión 4,73% e índice de reingreso 1,72%. No hemos encontrado diferencias en el grado de satisfacción entre ambos años.

**Conclusiones.** Los IC permiten conocer y analizar el funcionamiento y los resultados de las distintas unidades de gestión. En nuestra Unidad, la pandemia por COVID-19 no ha reducido la calidad de la asistencia en régimen de CMA.

**PALABRAS CLAVE:** Cirugía mayor ambulatoria (CMA); Cirugía pediátrica; Indicadores de calidad; COVID-19.

## INTRODUCTION

Major Outpatient Surgery (MOS) is an organizational and management model for surgical care that allows selected patients to be treated safely and efficiently without the need for hospital admission. It offers numerous

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**Table 1. Quality indicators proposed by the International Association for Ambulatory Surgery (IAAS).**

1. Cancellation of scheduled procedures
2. Unplanned reoperation on the same day as the surgery
3. Unplanned admission on the same day as the surgery
4. Unplanned visit of the patient to the Unit or to the Hospital
5. Unplanned readmission to the Unit or to the Hospital
6. Patient satisfaction

**Table 2. Quality indicators proposed by the Spanish Ministry of Health and Consumer Affairs.**

1. Cancellation rate
2. Suspension rate
3. Reoperation rate
4. Unplanned admission rate
5. Readmission rate and emergency room attendance rate
6. Ambulatory rate
7. Substitution rate
8. Patient satisfaction

advantages for both the patient and the healthcare organization. For the former, it means a reduction in stress and less interference in the patient's and the family's daily life, resulting in greater patient acceptance and satisfaction. For the healthcare organization, it means a reduction in economic impact, since it is a surgical approach with the capacity to increase system efficiency, as it has been shown to improve the organization and operation of the centers, maintaining results with a lower consumption of resources and healthcare costs<sup>(1,2)</sup>.

MOS includes all procedures that can potentially speed up and reduce surgical waiting lists (SWL), improving system efficiency without reducing quality of care<sup>(1)</sup>. However, as in all healthcare activities, it is necessary to know what is done and how it is done, establishing action protocols and quality indicators that make it possible to assess the quality and safety of the care provided<sup>(2)</sup>.

The ultimate objective of all health care, and in this case, of MOS, is to ensure patient safety. To this end, it is necessary to monitor care quality standards on an ongoing basis to detect and prevent negative aspects and introduce improvements to solve them, resulting in an increase in patients' satisfaction and perception of quality<sup>(3)</sup>.

Quality Indicators (QIs) should include key aspects of the efficiency and quality of the system, as well as the quality perceived by users. Accordingly, in 2006, the International Association for Ambulatory Surgery (IAAS) defined the six basic clinical indicators that include the care quality aspects required for this purpose (Table 1).

Furthermore, in 2008, the Spanish Ministry of Health and Consumption published a series of recommendations for establishing Quality Indicators in MOS that could prove useful for analyzing and assessing system efficiency (Table 2).

Among the various quality indicators proposed are the ambulatory rate (AR), which measures the proportion of surgical procedures performed on an outpatient basis in relation to the total number of surgical procedures performed; the substitution rate (SR), defined as the proportion of potentially outpatient procedures performed under the MOS system with respect to the total number of such procedures scheduled; the hospitalization rate (HR), which indicates the proportion of patients who required hospitalization because they could not be discharged after undergo-

ing surgery under the MOS system; the cancellation rate, which refers to the number of operations scheduled to be performed under the MOS system that were cancelled; the suspension rate, which indicates the number of patients who were not admitted and were not operated on for some reason; the readmission rate, which measures the number of patients who were discharged after surgery under the MOS system and who required readmission in the hours or days following surgery due to some post-surgical complication; and, finally, the degree of family satisfaction.

By means of Diagnosis Related Groups (DRGs), it is possible to assess the quality of the most frequently performed surgical procedures, measuring and comparing indicators such as the Substitution Rate. The DRGs are a patient classification system with which one can relate the clinical characteristics of patients (in our case due to the surgical procedure performed) with the consumption of resources.

The objective of this study was to assess the quality of the different activities through standardized quality indicators, analyzing whether they have been altered during the COVID-19 pandemic or not.

## MATERIALS AND METHODS

An observational and comparative descriptive survey was conducted in 2019 and 2020 (pandemic period) regarding the quality indicators of MOS carried out by our Pediatric Surgery Department in a tertiary hospital. The suitability of the patient selection system was assessed, as well as whether the surgical programming is consistent with the needs and existing resources, minimizing cancellations and suspensions of surgical procedures.

The admission and immediate postoperative period of our patients is carried out in the surgical day hospital (SDH), which is a separate unit from the hospitalization unit, but administratively and architecturally dependent on the hospital. It has 10 beds for MOS, located on the second floor of the Maternity and Children's Hospital, adjacent to the children's operating rooms.

Most of the surgical procedures performed under the MOS system fall within the category of “decree surgery”. Decree surgery must be performed within a maximum period of 120-180 days, as dictated by Spanish Royal Decree 1039/2011, of July 15, which establishes “the framework criteria to guarantee a maximum time limit for access to the health benefits of the National Health System”.

In 2020, this organization was affected by COVID-19.

At the beginning of the pandemic, all scheduled surgical activity was suspended, resulting in an almost total stoppage, with only emergency surgery and oncological surgery being performed. Subsequently, scheduled care activity was resumed with the performance of MOS and priority operations and - progressively - scheduled surgery. MOS was performed in the afternoon, and when the “new normal” began, the number of operating rooms available per week was increased. Morning surgery took longer to return to normal because many of the anesthesiologists and nursing staff were transferred to COVID units.

Meanwhile, the physical space of the SDH was used for the installation of an Intensive Care Unit for adults, so patients admitted for MOS were managed on the hospitalization floor, which was available for the reason explained above.

All patients eligible for major outpatient surgery were required to take a PCR test to rule out active SARS-CoV-2 infection prior to surgery. This test had to be performed within 48-72 hours before the date of surgery. Initially, all patients underwent PCR testing at our center, but later, diagnostic tests were performed according to the health district to which each patient belonged, i.e. northern, southern or central area. The result was checked 24 hours after the date of surgery by unit staff (assistants and residents) through the Diraya Clinical Station, a computer system through which the clinical information of all patients in the province of Cordoba can be accessed. In the event of a positive result, the family was immediately called to inform them of the result and to cancel the operation. It should be noted that at the beginning of the pandemic, the number of positive results in children was minimal.

In accordance with the International Association for Ambulatory Surgery (IAAS) and the recommendations of the Spanish Ministry of Health and Consumer Affairs, we assessed the basic quality indicators established: cancellation rate, suspension rate, readmission rate, substitution rate (SR), hospitalization rate (HR), and ambulatory rate (AR).

Some of these indicators are calculated for the most common DRGs, including DRG 483 - Penile, testicular and scrotal procedures, DRG 228 - Inguinal, femoral and umbilical hernia procedures, DRG 468 - Other kidney and urinary tract diagnoses, signs, and symptoms, and DRG 364 - Other skin, subcutaneous tissue and related procedures. We also compared family satisfaction through a

survey carried out among parents or legal guardians of the patients who underwent MOS.

Statistical analysis of the above variables was performed using the IBM SPSS Statistics V23.0 statistical package, comparing results between the two years by means of contingency tables, using the  $\chi^2$  test. Statistical significance was established at  $p < 0.05$ .

## RESULTS

The total number of scheduled operations performed in our Unit in 2019 and 2020 was 848 and 652, respectively. The mean age of the patients operated on under the surgical day hospital (SDH) system was estimated to be 6 years in 2019, and 7 years in 2020, with an age range of 1-14 years.

539 operations were performed under the SDH system in 2019, with an AR of 63.6%, and 465 operations in 2020, with an AR of 71.3%, with no significant differences being observed between the two years ( $P > 0.05$ ).

In 2019, the overall SR was 96.8%, while the hospitalization rate was 1.67%, the suspension rate was 5.94%, and the readmission rate was 1.48%. In 2020, the overall SR was 98.3%, while the hospitalization rate, suspension rate, and readmission rate were 0.86%, 4.73%, and 1.72%, respectively. No significant differences were observed ( $P > 0.05$ ), and it can be asserted that our quality indicators have not been affected by the pandemic.

DRG 483 included the performance of procedures such as circumcision, preputioplasty, orchidopexy, hydrocelectomy and frenectomy, which accounted for 36.6% of the operations performed under MOS in 2019, and 34.1% in 2020.

GRD 228 included procedures such as inguinal herniotomy and umbilical and supraumbilical hernia repair, accounting for 16.3% of MOS operations in 2019, and 17.1% in 2020.

GRD 468 included procedures such as cystoscopies, double J placement and STING, among others, accounting for 6% of total operations in 2019, vs. 7.6% in the following year.

GRD 364 included the excision of skin lesions and performance of ungiectomies among other procedures, accounting for 24.3% of procedures performed in 2019, and 25.8% in 2020.

In 2019, the SR was 100% for GRD 483, 95.8% for GRD 228, 97.6% for GRD 468 and 98.6% for GRD 364. In 2020, it was 98.8%, 95%, 96.5%, and 99.1%, respectively, for the same procedures.

No significant differences were observed between the most common GRDs ( $P > 0.05$ ).

Regarding the degree of patient satisfaction, we found no differences in 2020 compared to 2019 ( $P > 0.05$ ).

95.1% rated the overall care received as excellent or very good in 2019, while 100% did so in 2020.

42.6% of parents rated the pre-surgery information as excellent, 29.6% as very good, and 25.9% as good in 2019, while the figures were 65.2%, 26% and 6.5% respectively in 2020.

In 2019, 87% rated the medical treatment as excellent or very good, while 93.5% rated the nursing treatment as excellent or very good. In 2020, 84.8% rated the medical treatment as excellent or very good and 100% did so with respect to nursing treatment.

98.3% stated that discharge instructions were clear and understandable in 2019, while 100% did so in 2020.

In both 2019 and 2020, 100% responded that they would recommend the care received at our hospital.

## DISCUSSION

The analysis of efficiency indicators in MOS helps us to identify situations and/or deviations on which to take measures, giving us the opportunity to establish desirable quality objectives. An example of this are the substitution and ambulatory rates, specific MOS rates. In addition to measuring the efficiency of our system, they enable us to perform benchmarking, that is, to carry out a systematic and continuous process of assessment of the products, services and work processes among the different MOS units of other specialties or other centers with similar characteristics<sup>(2,3)</sup>. The degree of user satisfaction is also a key indicator in MOS, since we can find out how our patients rate the care received by means of easy-to-interpret tools, such as satisfaction surveys<sup>(3)</sup>.

These satisfaction surveys seek to question families about the physical structure of the Unit and the comfort of the facilities, the waiting time until the date of surgery, the information received about the operation to be performed, adequate postoperative pain control and the absence of complications, respect for intimacy and privacy, the competence of and treatment received by all the professionals involved in the care activity, and satisfactory postoperative follow-up.

The literature reviewed provides different data.

Rodríguez Ortega et al.<sup>(4)</sup> calculated the ambulatory rate of their hospital from 2006 to 2014, obtaining an AR of 50.2% to 64%. In our survey, we obtained an AR of 63.3% in 2019 and an AR of 71.3% in 2020.

Mateo Cerdán et al.<sup>(1)</sup> conducted a survey of basic quality indicators in patients undergoing outpatient surgery in the different surgical specialties in a public hospital. The substitution rate was on average 58.2% (25.3-99.2%), while the suspension rate was 6.95% (0.54-15.29%) and the readmission rate was 4.03% (0.26-8.56%).

In our survey, the SR was 96.8% in 2019, and 98.3% in 2020. Regarding the suspension rate and readmission rate, these were 5.94% and 1.48% in 2019, and 4.73% and 1.72%, respectively, in 2020.

Other authors such as Martínez Rodenas<sup>(3)</sup> calculated and compared the ambulatory rate of the different surgical services performing MOS in their hospital for 2010, 2011 and 2012, finding an AR of 27.4% to 98.6%, a hospitalization rate of 0.1% to 5.5%, and a suspension rate of 0.2% to 7.9%, depending on the surgical specialty. In our survey, the hospitalization rate was 1.67% and 0.86% in 2019 and 2020, respectively.

Meanwhile, Flores<sup>(2)</sup> calculated the SR for the most common surgical procedures performed in adults in a General Surgery Department, so it cannot be compared with our results. Furthermore, when comparing our results with the literature, patients' rating of the MOS units is, in general, very positive.

The MOS Quality Indicators are an easily accessible comparative tool and, by means of a continuous and periodic assessment of the activity carried out, show us and enable us to review the performance of the different management units, assess the results, and implement new improvements<sup>(4)</sup>.

This study, in addition to measuring the CR of our pediatric surgery unit, has attempted to ascertain whether the quality of care provided using this model has been affected by a global pandemic situation. As it is well known, MOS can cover more than 85% of the surgical procedures performed in a surgical department or in a unit with surgical activity. Thus, MOS has proven to be a safe alternative in the context of the current pandemic. The COVID-19 pandemic has led to a change in healthcare activity, from the suspension of scheduled surgical activity, operating exclusively on patients with urgent and/or severe pathology, to the transfer of surgical hospital beds for the care of COVID-19 patients, as well as the use of all available resources, both personal and material, which have been made available for the control of this pandemic<sup>(5-7)</sup>.

However, the measures carried out during the pandemic and the management of resources are known not to have been consistent during 2020, with more restrictive periods, such as the well-known "lockdown", and periods in which Spain gradually began to move towards what was called the "new normal".

All this has been manifested in our department through the implementation of structural alterations, as it is the case with the concession of extraordinary sessions for MOS, through the exclusive use of this surgical system and the increase in the number of afternoons per week dedicated to this activity during 2020, as well as the use of the hospitalization floor. As it can be seen in the results of our study, this made it possible to maintain the number of scheduled major outpatient surgical procedures.

This pandemic has provided an opportunity for improvement in patient care. In this context, the recommendation of the surgical societies has been to promote, as far as possible, the performance of MOS procedures, making them the center of scheduled surgical activity,

thus permitting the care of patients with non-COVID pathologies. In our Unit, these results have not been altered due to the COVID-19 pandemic, and no similar studies have been found in the literature. In the literature, we have not found any data referring to the analysis of quality indicators in other Pediatric Surgery Management Units, and we can only compare our results with rates measured in surgical units that carry out MOS procedures such as General and Digestive Surgery, and other medical-surgical specialties.

The absence of official comparative references of quality standards in MOS makes it difficult to determine whether the results obtained are desirable, so it would be an interesting idea to establish a simple, homogeneous, and applicable comparative system for all Pediatric Surgery MOS units at a national level.

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