

Did Ambulatory Surgical Units succeed in adapting to COVID-19 pandemic?

The experience of a Portuguese Hospital with Ambulatory Surgery

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Abstract

COVID-19 led to a break in the standard of medical practice. During the first outbreak, many Ambulatory Surgical Units (ASU) were adapted to the management of COVID-19 patients, as happened at Hospital de Braga. This article presents a descriptive analysis of ambulatory surgical activity at our ASU in 2019 and 2020. Although the total number of

procedures decreased, we achieved an increase in both ambulatory (72,6%) and day-case achievable procedures (51,8%) rates and Case-Mix Index (0,79), without compromising ambulatory surgery outcomes and quality indicators. At our ASU, the pandemic created the opportunity to improve the standard practice.

Keywords: Ambulatory Surgery, COVID-19, Quality Indicators.

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Introduction

In 2020, the Coronavirus disease 2019 (COVID-19) pandemic brought great changes to health care services management. Facing an inadequate capacity for the sudden surge of patients infected with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), many institutions had to proceed to a reorganization of standard practice (1-3). In many hospitals this response meant a restriction in all surgical specialties to priority cases. This measure enabled reallocation of health-care staff to COVID-19 units, limited unnecessary patient and staff exposure and prevented supply or personal protective equipment shortages (1,2).

In the early stages of the outbreak, many Ambulatory Surgical Units (ASU) were closed, postponing scheduled elective surgeries. At Hospital de Braga (HB), as in many Portuguese and worldwide ambulatory care facilities, the ASU shares operating and recovery rooms with the Central Operating Theatre and its activity was fully suspended during the first nationwide lockdown, from the 14th of March to the 8th of May 2020. For almost 2 months, only urgent and high priority surgical procedures were performed in our hospital. Waiting lists for moderate and low priority procedures kept growing continuously and, as in many other countries, public opinion pressure was turned towards the delayed health care of non-COVID patients (2,4).

Facing this scenario, institutions were advised to shift inpatient surgery to ambulatory settings, when feasible (4,5). The Portuguese "Guidelines for Resuming Surgical Activity in the COVID-19 Era" pointed that "The Ambulatory Surgery area should have preference in resumption of surgical activity and should be encouraged in this resumption of activity, maintaining its assumptions of operation: safety and quality in the anaesthetic and surgical care of our users" (5). Although, ambulatory surgery is pointed out to be safer for patients as the risk for nosocomial infection is reduced by a shorter length of stay in the hospital facilities (6,7), our Hospital Management Team encouraged every surgical speciality to expand the model of ambulatory surgery to more complex Day Case Achievable Procedures (DCAP). Simultaneously,

anaesthesiologists faced the challenge of patients with more complex and unstable medical conditions in the ambulatory settings and the challenge of DCAP feasibility.

This article aims at comparing the effects of the COVID-19 pandemic on several Quality Indicators (regularly used to monitor surgical activity in ASUs) in 2019 and 2020, showing how the aforementioned strategies influenced clinical and efficiency outcomes that can lead to AS development by having more complex patients and procedures eligible for this surgical regimen.

Methods

This is a retrospective single-centre descriptive analysis that aims to evaluate and compare several quality and efficiency indicators of the ambulatory surgical activity between the civil years of 2019 and 2020. Data was provided by the Planning and Efficiency Department of HB.

The ASU activity is described regarding several quality indicators used at HB to monitor the ambulatory surgical activity. The primary outcomes are Ambulatory Rate (AR), Day-case achievable procedures (DCAP) rate and Case-Mix Index (CMI).

AR represents the number of ambulatory procedures over the total number of non-urgent elective surgeries. Rates are presented as global surgical activity AR and individualized for each surgical specialty as well.

DCAP are defined as procedures predictably executed in less than 24h, though not universally performed in the ambulatory set. The DCAP rate represents the number of DCAP performed in the ambulatory setting over the total number of DCAP performed at HB.

CMI is an index that correlates with severity of patients' health status and results from the ratio between the number of equivalent patients weighted by the relative weights of the respective diagnosis related groups (DRG) and the total number of equivalent patients.

It is calculated for each civil year, being commonly used in our ASU as an indicator of patients' complexity and stability of comorbidities.

We considered secondary outcomes: (1) unexpected admission rate, representing the number of unpredicted inpatient hospitalization from the ASU; (2) readmission rate, representing the number of patients operated at the ASU that were admitted to the institution in the first 48h after discharge; (3) same-day surgery cancellation rate, representing the number of surgeries cancelled in the same day of surgery; (4) reintervention rate, representing the number of ambulatory patients who underwent reintervention, in the first 48h, as ambulatory patient, and the first 30 days, as inpatient surgery; (5) overnight-stay rate, representing the number of patients that spent the first night after surgery at the ASU but still were discharged before completing 24h after admission.

Descriptive statistics of the results obtained is presented. Categorical variables are expressed as frequencies (n) and percentages (%).

Results

Compared with 2019, in 2020 we verified a decrease in both overall elective non-urgent surgical activity (from 28080 to 25414 procedures – 9.2% fall) and in ambulatory surgical activity, although at a minor extent (from 19270 to 18461 procedures – 4.2% fall) (Table 1). Although the number of ambulatory and global surgical procedures decreased, the AR showed an increase of 4% (from 68.6% to 72.6%) in 2021, overcoming the annual mean growth rate of less than 2% that had been observed at our institution since 2011 (Figure 1).

The distribution of ambulatory activity according to specialty is

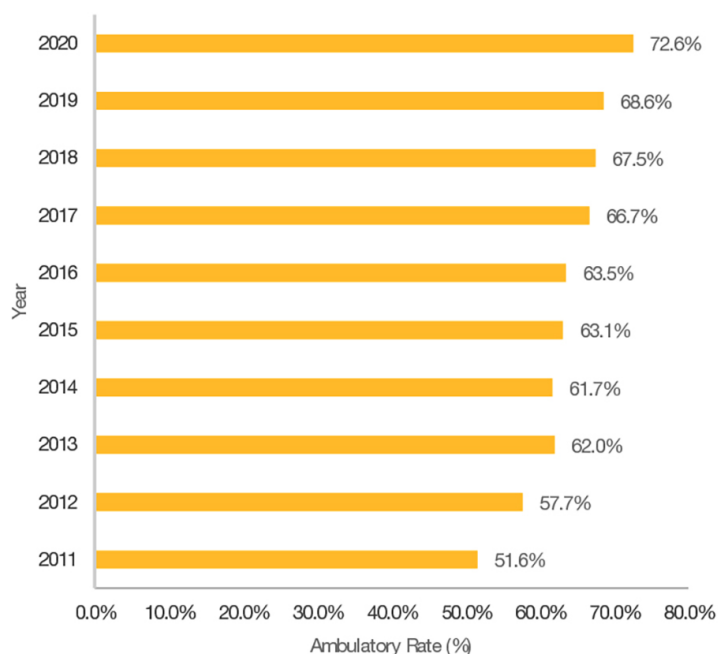


Figure 1 Ambulatory rate evolution at Hospital de Braga's Ambulatory Surgical Unit since 2011.

presented in Figure 2, which points ophthalmic procedures as the most frequent at the ambulatory setting, representing 60.1% (n=11103), in 2020, and 62.4% (n=12034), in 2019. At the same time, we verified that some specialties tended to increase their AR as was the case of Vascular Surgery, General Surgery and Paediatric Surgery that recorded the biggest increase in AR, with an increase of 18.2%, 15.6%, and 11.1%, respectively. Maxillofacial surgery showed a decrease of 4.6%, but that can be explained by the usual low number of surgical procedures performed at our hospital (Figure 3).

Table 1 Comparison of 2019 and 2020 ambulatory surgery primary and secondary outcomes.

Year	2019	2020
Surgical Activity (n)		
Elective surgery	28080	25414
Ambulatory surgery	19270	18461
Primary Outcomes (%)		
Ambulatory rate	68,6%	72.6%
DCAP rate	14.3%	51.8%
CMI	0.76	0.79
Secondary Outcomes (% (n))		
Same-day surgery cancellation rate	9.3% (n = 1967)	4.5% (n = 861)
Unexpected admission rate	1.4% (n = 279)	1.1% (n = 201)
Overnight stay rate	3.4% (n = 659)	3.6% (n = 663)
Readmission rate	0.03% (n = 5)	0,01% (n = 1)
Reintervention rate (Ambulatory surgery at 48h)	0.01% (n = 1)	0.01% (n = 2)

DCAP - day-case achievable procedure CMI - Case-Mix Index

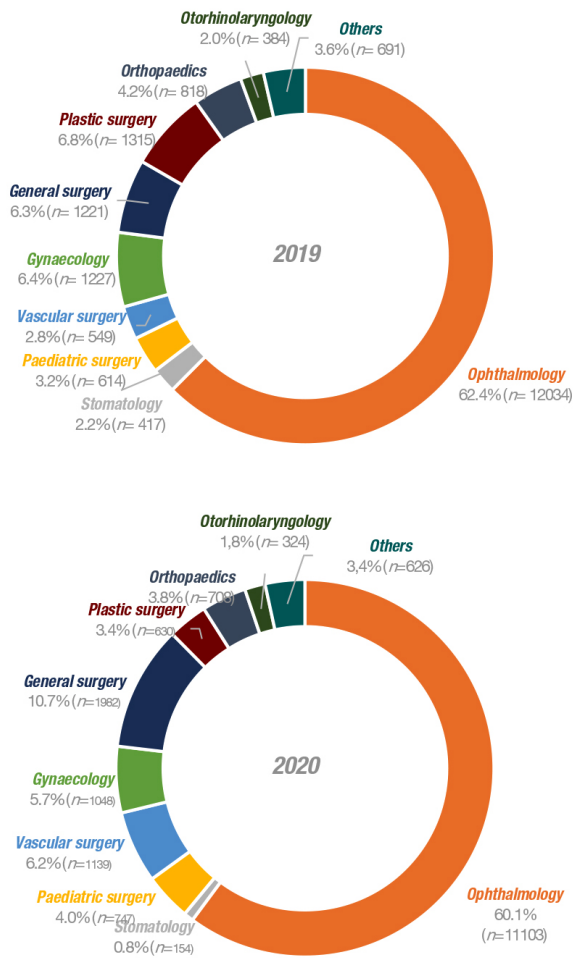


Figure 2 Ambulatory surgical production distributed by specialty.

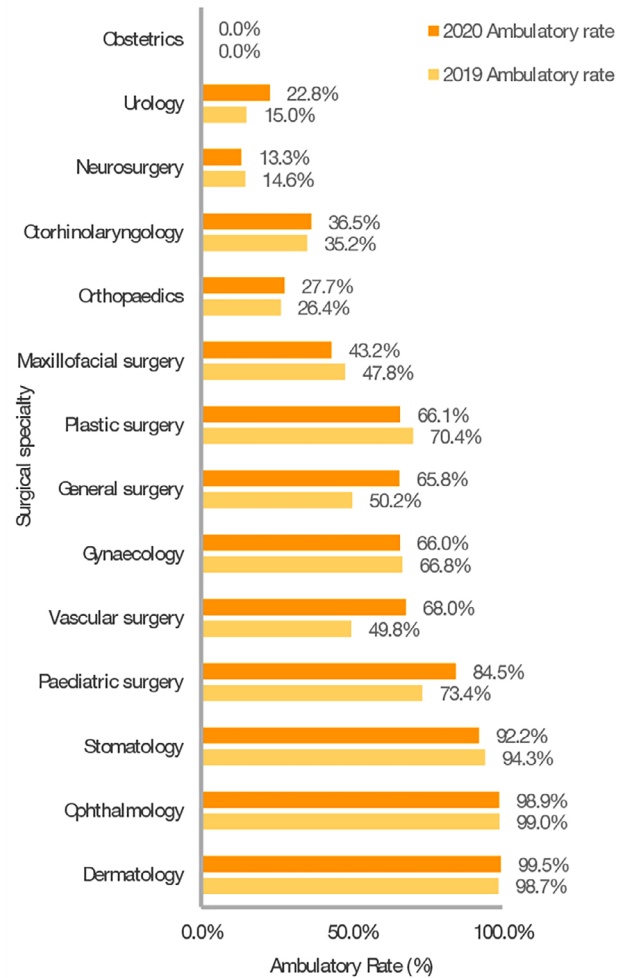


Figure 3 Ambulatory rate distributed by specialty.

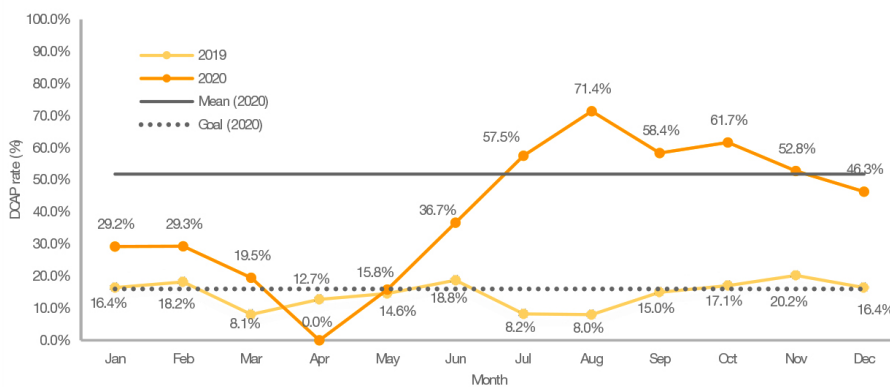


Figure 4 Day-case achievable procedures (DCAP) rate in 2019 and 2020, distributed by month.

Concerning DCAP rate, represented in Figure 4, January 2020 started with a rate of 29.2% then abruptly declined to 0%, in April, as the unit closed, and our infrastructure used as a COVID Operating theatre. The ASU reopened in late May with a 15.8% rate of DCAP, that progressively peaked to 71.4% in August 2020, after which, the performance of DCAP slowed down to 46.3% in December 2020. Globally, in 2020, we achieved a DCAP rate of 51.8% exceeding the National Goal of 16%, expected from our institution, and the value of 14.3% in 2019. As reported in Table 2, the most relevant DCAP contributing to these results in 2020 were laparoscopic cholecystectomy (DCAP rate of 75.5%) and hemithyroidectomy (DCAP rate of 50.0%).

CMI also points towards an increase of complexity of the patients included in the ambulatory pathway, with an increase of 0.76 (2019) to 0.79 (2020).

Regarding the secondary outcomes of ambulatory surgery, in 2020 there was general positive evolution of several quality indicators. There was a decrease in the rates of unexpected admission (1.4% to 1.1% rate) and same-day surgery cancellation rate (9.3% to 4.5% rate), compared to the previous year. The need for readmission (<0.1% rate) and ambulatory reintervention in the first 48h for ambulatory (<0.1% rate) were maintained stable. The only quality indicators with a negative evolution were overnight-stay rate, with a mild increase of 0.2% (from 3.4%, in 2019, to 3.6%, in 2020) and inpatient reintervention in the first 30 days, with a minor increase of 0.02% (x patients) from 0.14% to 0.16% (Table 1).

Discussion

The COVID-19 pandemic led to a sudden disruption in the standard practice of medicine, implicating changes in the priorities of the

Table 2 Day-case achievable procedures at Hospital de Braga.

DCAP	AMBULATORY PROCEDURES (n)	TOTAL NUMBER OF PROCEDURES (n)	DCAP RATE (%)
Laparoscopic cholecystectomy	446	591	75.5%
Hemithyroidectomy	27	54	50.0%
Abdominoplasty	3	20	15.0%
Bilateral reduction mammoplasty	5	23	21.7%
Cruciate knee ligaments repair	1	12	8.3%
Cystocele and rectocele repair	3	81	3.7%
Transurethral prostatectomy	1	38	2.6%
Spinal discectomy	4	174	2.3%
Laparoscopic anti reflux surgery	0	5	0.0%
Mastectomy	0	57	0.0%

Portuguese Health Care System, namely by closing of Operating Theatres, delaying surgeries and postponing some of the high priority surgical interventions. Staff were mobilized and some ASUs (ours included) were completely adapted to the treatment of COVID patients. At HB, after the mid-March COVID-19 pandemic outbreak, surgical care was restricted to urgent and high priority surgery, leading to the closure of our ASU for 8 weeks from the 14th of March to the 8th of May. During this period, our facilities were adapted to the surgical management of SARS-CoV-2 suspected or positive patients. When the unit reopened, though restrictions in activity were in place to ensure patient and staff safety, we found an improvement in the rates of our ambulatory surgical activity, as outlined by our “Guidelines for Resuming Surgical Activity in the COVID-19 Era”. So, despite a decrease in the absolute number of global and ambulatory surgical procedures at our institution, we noticed an increase in both AR and DCAP rates and CMI, without compromising the ambulatory surgery outcomes and quality indicators monitored at the institution.

The working model for ambulatory surgery, at Hospital de Braga, allowed an efficient response to the increasing waiting list observed during the first nationwide lockdown. Although there were restrictions in the patient management, we achieved an AR of 72,6%, which is superior to the AR recorded in the year of 2019 at our ASU and the 64,9% rate registered in Portugal, during 2020 (8). The increase in AR allied to a great increase in the rate of DCAP, reflects a tendency to expand the scope of procedures performed in the ambulatory setting. Laparoscopic cholecystectomy and hemithyroidectomy are the most significant. The DCAP rate for these surgeries stands above the Portuguese national rate, as we achieved DCAP rates of 75,5% for laparoscopic cholecystectomy and 50,0% for hemithyroidectomy, given the national rate of 36,1% and 23,5%, respectively (8,9). Also, the increase of CMI in 2020 reveals a tendency to expand the medical complexity of patients included in our ambulatory surgery protocols (10).

The increase in ambulatory procedure complexity was achieved at the expense of a slight increase in overnight-stay rate from 3,4% to 3,6%, in 2020, even though Portuguese guidelines for resuming surgical activity after COVID-19 outbreak advised its eviction (5). Nevertheless, the rates of unexpected admission and same-day surgery cancellation have decreased, whereas the need for readmission and ambulatory reintervention was maintained at low

rates, revealing adequate preoperative patient screening and day-case management.

Facing the new standards, not compromising our patients and workforce’s security during a pandemic outbreak was one of the many challenges. The preoperative assessment included testing all patients, except for those with healing criteria, for SARS-CoV-2 with an Rt-PCR test in the previous 48-72h, as stated by the Direção Geral de Saúde Portuguesa (Portuguese General Health Directorate) and advised by the international community (4,11,12). Also, as recommended by the Portuguese “Guidelines for Resuming Surgical Activity in the COVID-19 Era”, all patients were provided with an individual surgical facemask before entering the hospital, assessed for COVID-19 risk contacts or symptoms before being admitted to ASU and the ambulatory circuits were reviewed to ensure a security distance between patients (5). However, patients’ SARS-CoV-2 infection after surgery was not routinely evaluated at our Unit and did not figure as an endpoint of this study.

This single-centre descriptive analysis has several limitations. First, it would be important to evaluate and compare the overall patient’s satisfaction after ambulatory surgery while increasing the complexity of procedures and patients. To confirm the increase in patient’s complexity, ASA physical status should have been evaluated and compared, but the records provided were insufficient.

Conclusion

The results reported show that ambulatory surgery may promote the sustainability of Healthcare Systems that face the need to design an effective response to the COVID-19 pandemic. At HB, the ASU closed during the first nationwide lockdown and its facilities were adapted to the surgical management of SARS-CoV-2 suspected or confirmed patients. The unit reopened in May and readapted its standard practices to the new paradigm. Although we verified a global decrease in surgical activity, we achieved an increase in AR and DCAP rate, which reveals that ambulatory surgery provided a solution to bypass the scarcity of ward beds for inpatient surgical care. We conclude that ambulatory surgery is a powerful tool to grant resilience and agility to a health care system dealing with such challenging scenarios.

In our experience we can say that the COVID-19 pandemic came as an opportunity to cross some boundaries and offer the benefits of ambulatory surgery to more patients and, at the same time, helping our National Health System avoid the unacceptable growth of surgical waiting lists.

References

1. Spinelli A, Pellino G. COVID-19 pandemic: perspectives on an unfolding crisis. *British Journal of Surgery* 2020;107:785–7.
2. Rajan N, Joshi GP. COVID-19: Role of Ambulatory Surgery Facilities in This Global Pandemic. *Anesthesia & Analgesia* 2020;131:31–6.
3. Begun JW, Jiang H J. Health Care Management During Covid-19: Insights from Complexity Science. *New England Journal of Medicine Catalyst: Innovations in Care Delivery* 2020. doi:10.1056/CAT.20.0541.
4. Royal College of Surgeons of England. COVID-19: Good practice for surgeons and surgical teams. COVID-19: Good practice for surgeons and surgical teams. (2020) at <https://www.rcseng.ac.uk/standards-and-research/standards-and-guidance/good-practice-guides/coronavirus/covid-19-good-practice-for-surgeons-and-surgical-teams/>
5. APCA. Recomendações Nacionais: Retorno Da Atividade Cirúrgica Na Era Covid-19 Cirurgia de Ambulatório. Recomendações Nacionais Retorno Da Atividade Cirúrgica Na Era Covid-19 Cirurgia de Ambulatório. (2020) at http://www.apca.com.pt/documentos/recomendacoes/recomendacoes_nacionais_retoma_da_ca.pdf
6. Lee JH. Anesthesia for ambulatory surgery. *Korean Journal of Anesthesiology* 2018;4:398–406.
7. Dexter F, Elhakim M, Loftus RW et al. Strategies for daily operating room management of ambulatory surgery centers following resolution of the acute phase of the COVID-19 pandemic. *Journal of Clinical Anesthesia* 2020;64: 109854.
8. Saúde SN. de. Cirurgias em Ambulatório. (2021) at <https://transparencia.sns.gov.pt/explore/dataset/cirurgias-em-ambulatorio/>
9. Saúde, S. N. de. SPMS - Serviços Partilhados do Sistema Nacional de Saúde. (2021) at <https://www.spms.min-saude.pt/>
10. Birg G. Case Mix Index - Analyzing Case Mix Index and the Impact on CDI Programs. (2011) at www.huronconsultinggroup.com/healthcare
11. Direção Geral de Saúde. Norma no 019/2020 de 26 de outubro de 2020 atualizada a 26 de fevereiro de 2021. Estratégia Nacional de Testes para SARS-CoV-2. Serviço Nacional de Saúde (2021) at <https://www.dgs.pt/normas-orientacoes-e-informacoes/normas-e-circulares-normativas.aspx>
12. American Society of Anesthesiologists and the Anesthesia Patient Safety Foundation Statement on Perioperative Testing for the COVID-19 Virus. (2020) at <https://www.apsf.org/news-updates/asa-and-apsf-joint-statement-on-perioperative-testing-for-the-covid-19-virus/>