Impact of the First COVID-19 Wave on Surgical Training in Flanders: Are we Losing Competence?

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Abstract

BACKGROUND: The COVID-19 pandemic has tremendously impacted the healthcare system and residency programs worldwide. Surgical residents were redeployed to COVID-19 units whereas education and scientific didactics were reduced. The aim of this study is to identify the impact of COVID-19 on Flemish surgical residents' education, personal life and volume of performed surgeries.

METHODS: A cross-sectional retrospective survey on educational and personal impact during the first COVID-19 wave was administered anonymously to all surgical residents in Flanders. A quantitative comparison of performed surgeries during this period and the same period a year earlier was conducted.

RESULTS: 193 surgical residents (46%) completed the survey. 63% of residents were no longer admitted to multidisciplinary oncologic meetings and 107 (55%) residents had no longer any scientific meetings at all. 46% of the residents indicated more than 50% reduction in time in the operating theater. 31% of residents was involved in care for COVID-19 positive surgical patients. 78% of the residents experienced a negative impact on their surgical training and 41% experienced a negative influence on their private situation. Performed surgical cases during the COVID-19 period were on average 40% less for second, third- and fourth-year residents.

CONCLUSION: Surgical residents perceived a high negative impact on personal and professional lives during the start of the COVID-19 pandemic in Flanders. Education and training programs were cancelled and volume of performed surgeries decreased tremendously. Policymakers and surgical program coordinators should ensure surgical education during further evolution of this and future pandemics.

Introduction

In December of 2019 a new coronavirus (SARS-CoV-2) rapidly spread throughout the world after it was identified in Wuhan, China [1]. The World Health Organization declared this COVID-19 a pandemic on March 11th, 2020 [2]. In Belgium, the federal government declared a national lockdown on March, 18th until April 5th 2020 in an attempt to contain the virus spread. Within the healthcare system, changes were rapidly made to the allocation of resources, workflows, and daily operations, from the cancellation of non-emergent surgeries to the transition of many disciplines to telehealth medicine [3, 4]. The impact on surgical residents has been countless, including alterations in work schedules, deployment to units caring for patients with COVID-19, and significant modifications in resident education. Many institutions transitioned to remote academic sessions, research conferences were postponed or cancelled, and requirements for exams were changed. Surgical residents depend on their number of performed procedures for their learning curves and surgical exposure [5]. Since non-emergent surgeries were cancelled and a number of residents was reallocated to COVID-19 wards, this had a great impact on their training progress [6–8]. Different studies have described ways to adapt the curricula or reorganize surgical training by video-based learning or telehealth [8–11]. Few studies assessed the impact of these

changes on residents' number of performed surgeries and their attitudes towards these changes during this COVID wave [7, 12].

The aim of this study is twofold. First, to assess the effects of the pandemic on residents' education and experience. Second, to quantitatively measure the decrease in case volume of performed surgeries during the pandemic compared to the same period in normal circumstances the year before.

Material And Methods

Effects on education and experience

To assess the experience and attitudes towards the impact of the COVID-19 pandemic on surgical residents, an online survey consisting of 28 questions was created (**Additional file 1**). The survey consisted of 5 main topics: residents' education, patient contact, surgical performance, work planning and personal life. This survey was administered anonymously through Qualtrics® to all surgical residents in Flanders, Belgium. This included orthopedic surgery, urology, general surgery and plastic surgery residents of all 4 Flemish universities providing surgical training. A survey invitation link was sent by the surgical program coordinators of each university, by the Flemish Association of Medical Specialists in Training (VASO) and the Belgian association of surgical trainees (BAST). The survey was available for respondents between July and October 2020 and 3 reminders were sent. Each participant had to give informed consent before starting the survey. It was specified to answer the survey questions in the light of the first COVID-19 wave in Belgium (March-May 2020).

Descriptive analyses were performed for the entire respondent group, followed by stratified analysis by year of residency and type of hospital employed (i.e. university hospital or general hospital). Descriptive statistics were reported with percentages and analyzed using Qualtrics® software.

Case volume of surgeries

In Flanders, Belgium, residents have to register their performed procedures (number and type of procedure) on a regular basis in an independent online system together with their degree of independence during the surgery. This platform (Medbook®, Imengine, Leuven, Belgium [13]) is used by supervisors and program coordinators to assess the learning curve of each resident. For this study we compared the performed cases between March-May 2020 (the lockdown period) with the same period in 2019. The volume of procedures by each resident who gave an informed consent was delivered by Medbook® on a secure server after complete anonymization. The data were analyzed and stratified by year of residency to assess variations in impact by level of training. Data were reported as averages by year of residency for each surgical discipline. Statistical analysis was performed with IBM SPSS Statistics 20.0 using an independent t-test. P-value of 0.05 was considered to be statistically significant.

Results

Out of 419 Flemish surgical residents, 193 respondents (46%) completed the questionnaire. Detailed demographic characteristics are depicted in Table 1.

Table 1
demographic characteristics of respondents (n = 193)

Characteristics	Number (%)
Year of training	
1	43 (22)
2	53 (27)
3	37 (19)
4	20 (10)
5	16 (8)
6	24 (13)
University	
Catholic University Leuven	103 (53)
Free university of Brussels	22 (11)
University of Ghent	34 (18)
University of Antwerp	21 (11)
Not defined	13 (7)
Specialty	
General surgery	99 (51)
Orthopedic surgery	49 (26)
Reconstructive surgery	6 (3)
Urology	39 (20)
Region where active	
Flemish-Brabant / Brussels	65 (34)
Antwerp	54 (28)
East- and West-Flanders	54 (28)
Limburg	20 (10)
Type of hospital	
University hospital	70 (36)
Regional hospital	123 (64)
Status of hospital COVID-19 admissions	

Characteristics	Number (%)
0–20	12 (6)
21–50	14 (7)
51–100	37 (19)
>100	130 (67)

Effect of COVID-19 pandemic on teaching activities

Seventy-six (39%) residents indicated that meetings were organized as usual, but with hygienic measures (social distancing, mouth masks...) and 50 (26%) residents indicated that there were no more organized meetings (only ad hoc meetings). 18% of the respondents indicated that there were less frequent meetings, but still with direct contact and hygienic measures. Only 11% of the residents had digital meetings, with the same frequency as before the COVID-19 pandemic and 6% had digital meetings but less frequently. 79% of the residents were still admitted to department specific meetings and 21% were excluded.

Forty-five residents (23%) indicated that the multidisciplinary oncologic meetings (MDOMs) were organized as usual, but with hygienic measures (social distancing, mouth mask...). 58 (30%) stated that the MDOMs were digitally organized, with the same frequency and 10 (5%) indicated that it was organized digitally but less frequent. 15 (8%) residents responded that there were no more organized MDOMs in the hospital (only ad hoc meetings). 53 (27%) of the residents never participate in MDOMs or indicated that it is not organized in their specialty. When asked if participants were admitted to MDOMs, 48% answered that they did and 26% that they didn't (26% not applicable). In university hospitals, 16% of those participating in MDOM were no longer admitted, while in regional hospitals 47% of residents normally participating were no longer admitted to these MDOMs.

Scientific meetings were no longer organized for 107 (55%) of the respondents, while 12 (6%) residents stated they had still real-life scientific meetings but less frequently. In 12% of the respondents, digital scientific meetings were organized with the same frequency and in 17% digital meetings were also organized but less frequently. In 10% of the respondents' answers, scientific meetings were organized as usual but with hygienic measures.

Effect of COVID-19 pandemic on patient contact

Contact with patients was organized as usual preoperatively (86%) and postoperatively (81%). Residents were appointed to outpatient clinic in 80% of the cases. Less than 20% of respondents indicated that video- or teleconsultations were organized for outpatient clinic visits.

Effect of COVID-19 pandemic on surgical performance

Most of the respondents (46%) indicated more than 50% reduction in time in the operating theater. 34% indicated less than 50% reduction in operating theater time. 1 in 10 respondents indicated that they were no longer assigned to the operating theater at all (**Fig. 1**). The degree of independence for executing surgeries was the same in 53% of the respondents. 12% indicated to have a higher degree of independence and 35% indicated a lower degree of independence (**Fig. 2**).

Effect of COVID-19 pandemic on planning schemes of residents

59% of residents working in a university hospital had to work less on average, compared to 78% in a regional hospital. In total, 71% had to work less on average and 7% had to work more on average (**Fig. 3**). The on-call frequency was higher (43%) in a regional hospital compared to 29% in a university hospital during the COVID-19 pandemic. For the whole group of respondents 38% indicated to have been more on call and 6% indicated to have been less on call (**Fig. 4**). 41% of respondents indicated that they didn't know their weekly schedule in advance during the COVID-19 crisis and that planning could change daily. Most of the respondents were involved in care for COVID-19 positive surgical patients (31%). Also, 20% indicated having to care for COVID-19 positive patients during triage and initial care in the emergency department and 16% worked in a COVID-19 hospital ward or COVID-19 intensive care unit (3%).

Effect of COVID-19 pandemic on personal life

There was sufficient availability of protective material in 84% of the respondents and 90% indicated adequate availability of protocols for the treatment and protection of COVID-19 positive patients. 12% of the respondents tested positive for COVID-19 themselves. Overall, 78% of the residents experienced a negative contribution of the crisis for their surgery training. The influence of the COVID-19 pandemic on the residents' private situation was negative in 41% of the respondents.

Quantitative analysis of number of performed surgeries

Logbooks of 338 residents were analyzed on their performed surgeries. 154 residents consented for the use of their data from 2019 and 184 consented for the use of their data from 2020. 168 logbooks were from general surgery residents, 89 were orthopedic surgery residents, 22 reconstructive surgery residents and 59 urology residents. First-year residents (70 respondents) were excluded for analysis because their number of surgeries could not be compared with the year before. The difference in mean performed surgeries between 2019 ($M = 127$; $SD = 83$) and 2020 ($M = 91$; $SD = 62$) was statistically significant ($p = 0.023$) for second-year residents, for third-year residents ($M = 155$; $SD = 111$ versus $M = 83$; $SD = 52$; $p = 0.007$) and for fourth-year residents ($M = 170$; $SD = 76$ versus $M = 107$; $SD = 75$; $p = 0.017$). The difference in mean performed surgeries between 2019 ($M = 136$; $SD = 85$) and 2020 ($M = 124$; $SD = 70$) was not statistically significant for fifth-year residents ($p = 0.652$) nor for sixth-year residents ($M = 145$; $SD = 91$ versus $M = 88$; $SD = 55$; $p = 0.096$) (**Fig. 5**).

Discussion

This study shows the many effects during the start of the COVID-19 pandemic on personal and professional lives of surgical residents in Flanders (Belgium), a severely affected region during that period. One in three residents were not allowed on MDOMs and six in ten residents had no scientific meetings at all. Fifty-six percent of the residents indicate more than 50% reduction of operating theater time compared to their time before the outbreak, and younger residents were mostly engaged in care for COVID-19 patients. Residents had to work less in general but were more on call. Overall, the perceived impact on surgical training was negative for 8 in 10 residents. Objective data on performed surgical case volume indicate that younger year residents had less surgical exposure than before the COVID-period. Older year residents were still able to perform surgeries and had no statistical difference in case volume. As the SARS-CoV-2 virus emerged all over the world, healthcare systems had to change rapidly to support COVID-19 patients and to keep other care ongoing. Residency programs had to be postponed and changed accordingly to ensure quality education of residents [9, 14]. For surgical residents in particular, COVID-19 has affected their volume of performed surgeries during the lockdown, as most non-emergent procedures were cancelled [15]. Few studies assessed the effect of this impact on surgical residents' life and education [16].

The impact on teaching activities for residents in Belgian hospitals was high: 55% of them no longer had any scientific meetings organized nor department-specific meetings and MDOMs. Also globally, hospitals struggle to preserve academic teaching for their residents during the pandemic [17–20]. We observed that more residents were admitted to multidisciplinary meetings in university hospitals. This can be explained by the academic function of these hospitals and their larger number of MDOMs. Interestingly, less than 20% of outpatient contacts was organized by video- or teleconsultation. This could be due to the limited experience in Belgium with this formula [20]. The Belgian government invested during the COVID-19 crisis in the further development of video consultations and the reimbursement of it so that it can continue after the pandemic.

Most residents in regional hospitals had to work less during the pandemic than before, although they had higher on call frequency. This could be explained by the deployment of residents to emergency units and newly created COVID-19 wards. In university hospitals, the total number of working hours per week was comparable to regional hospitals but the increase of their on-call frequency was less than in regional hospitals. This could be due to the fact that university hospitals in Belgium have the largest number of residents and could therefore count on a larger resident pool to fill in the extra shifts. The same trend is seen in other countries and resident programs [7]. It is remarkable that despite the high availability of personal protective material, still 12% of the residents were tested positive for COVID-19. This emphasizes the need for screening of healthcare workers. In Belgium, there is no generalized testing for healthcare staff and as such, the number does not include asymptomatic residents. A future study on immunity by antibodies may reflect the true infection rate more accurately [16]. The overall perceived negative impact on surgical education and residents' personal life is in line with previous studies [21–23] and shows the need for attention on this topic in the further evolution of the pandemic.

This study also sought to determine the impact of COVID-19 on their total number of performed surgeries by comparing the first COVID wave time period and its corresponding period in the year before. Younger year residents (second, third and fourth year) experienced a significant decrease in their performed surgeries during the COVID period. This could be explained by the fact that these residents were redeployed to other wards and emergency units. Older year residents (fifth and sixth year) did not experience a significant decrease in surgeries and a possible explanation could be found in the fact that they have a more independent degree in the operating theater and they could perform the emergency surgeries. This is in line with other countries where we see that surgical time for residents decreased sharply [14, 24–26].

This study has several strengths. The overall response rate of 46% and the response rate per specialty are high compared to other studies [27–30]. To our knowledge, this study is the first to calculate differences in performed surgeries between different training years based on objective registered data in 2 time periods. Most other studies used self-reported data from respondents in the survey [11, 31, 32]. This study also has some limitations. Not all hospitals were affected by the same number of COVID-19 hospitalizations and impact on structuring in hospitals could vary. We anticipated on this by asking the number of admitted COVID-19 patients in the hospital, but we did not exclude low-admission hospitals in our analysis. Nevertheless, more than 85% of respondents worked in a hospital with more than 50 COVID-19 admissions. Secondly, this study is prone to recall bias due to its retrospective nature. We minimised this bias in the calculation of number of performed surgeries by using the independent registry platform (Medbook®) to collect the data. Lastly, some of the specialty groups are relatively small (e.g. reconstructive surgery). We achieved good response rate for all specialties; however, we acknowledge that comparing disproportionate groups is a limitation for this study and for this reason we presented the data of the survey on an aggregated level for all surgical disciplines.

Conclusion

The results of this study highlight the enormous impact of the COVID-19 pandemic on surgical residents' training and personal life in Flanders, but also urge surgical program coordinators to reinvent today's surgical training. The perceived high negative impact on personal and professional life should be considered in the further evolution of the pandemic and surgical residents' supervisors have to invent new ways to continue education. A complete cancellation of surgical procedures for residents should be avoided in the future in order to maintain the learning curve and their surgical exposure.

Declarations

Ethics approval and consent to participate

This study obtained ethical approval of the ethics committee and institutional review board of UZ/KU Leuven (S64326). The resulting survey data were aggregated on a secure server for research purpose

only. Informed consent was obtained from all individual participants included in the study. All methods used in this study were carried out in accordance with relevant guidelines and regulations.

Consent for publication

Not applicable

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Not applicable

Authors' contributions

All authors have contributed substantially to the work. JB and LP designed the study; PDL critically reviewed the manuscript.

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Figures

Figure 1

Time in operating theater

Figure 2

Degree of independence during surgery

Figure 3

Working times on average

Figure 4

Duty hours on average

Figure 5

Mean performed surgeries

Supplementary Files

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