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Clinical-Prostate cancer
Impact of COVID-19 on Society of Urologic Oncology fellowship
operative volumes

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Abstract

Purpose: The COVID-19 pandemic impacted all aspects of healthcare including surgical training. Our objective was to assess the impact of the pandemic on surgical case volumes of graduating Society of Urologic Oncology (SUO) fellows during the academic years 2019 to 2020 and 2020 to 2021.

Materials and methods: Deidentified case logs for graduating SUO fellows from 2017 to 2021 were obtained from the SUO Education Committee. Cases are stratified by category and minimally invasive surgery (MIS) or open approach. Graduates of 2017, 2018, and 2019 were combined into a pre-COVID cohort and compared to COVID-affected 2020 and 2021 cohorts. Total case volumes, case category volumes, and surgical approach type were compared with Kruskal-Wallis test.

Results: A total of 173 graduating SUO fellow case logs were analyzed with 100, 38, and 35 in the pre-COVID and COVID-affected 2020 and 2021 cohorts, respectively. All fellow logs were obtained for 2017 to 2020 graduates while 5 of 40 were missing for the 2021 cohort. There was no statistical difference in median total cases across cohorts ($P = 0.52$). For the first COVID-affected cohort of 2020, they reported significantly fewer total MIS cases in 2020 compared to pre-COVID fellows (median 92.5 vs. 135 pre-COVID, $P = 0.002$). However, there were no significant differences among the tracked oncologic MIS categories except a statistically significant increase in MIS retroperitoneal lymph node dissection between 2020 and 2021 COVID-affected cohorts (0 vs. 2, $P = 0.033$).

Conclusions: The oncologic case volumes of the initial SUO fellows graduating during COVID pandemic were minimally affected. This national deidentified data is reassuring that oncologic training has not been impacted by widespread decreases in case volume. However, impacts on individuals, programs or geographic regions may have varied. © 2022 Elsevier Inc. All rights reserved.

Keywords: COVID 19; Surgical education; Case volumes; Urologic oncology; Fellowship

Abbreviations: SUO, Society of Urologic Oncology; MIS, minimally invasive surgery; RPLND, retroperitoneal lymph node dissection; US, United States; SARS-CoV-2, severe acute respiratory syndrome coronavirus 2; IQR, interquartile range; HPV, human papillomavirus

1. Introduction

The United States (US) healthcare system and medical education has had to adapt to the global pandemic of

coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). This has been particularly true of surgical specialties as many hospitals followed the recommendations of the American College of Surgeons to limit elective surgeries in March 2020 [1]. In anticipation of overwhelming COVID-19 case numbers as seen in Italy, the reduction of elective healthcare and surgical operations allowed hospitals to redeploy staff including urology trainees, preserve personal protective equipment, and maintain access to necessary equipment such as ventilators [2–4].

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Tweet: Minimal effect of COVID-19 on SUO fellow logged oncologic case volume in 2020 and 2021, but fewer overall minimally invasive cases in 2020.

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Urologic educators had significant concern about the impact on fellow and resident education as well as ideas to mitigate the effects [5]. During the initial shutdowns, 83% to 100% of urology program directors reported a decrease in surgical volume across subspecialty areas including oncology [6]. Residents in the same survey reported increased anxiety about their surgical abilities at graduation. Despite recognition that surgical delay for many urologic malignancies may affect outcomes, urologists globally reported a decrease and delay in oncologic cases, including testicular and bladder cancer, during the spring of 2020 [7–9].

In a recent survey of urology chief residents and recent graduates, over 70% chose to pursue fellowship training for additional training and confidence in challenging cases, a number of which are oncologic in nature [10]. The Society of Urologic Oncology (SUO) fellowships are typically 2-year programs consisting of a research year followed by a clinical year, although a few programs deviate from that structure. For most SUO fellows graduating in 2020, the COVID pandemic started as most were midway through their clinical year while 2021 graduates trained entirely through subsequent COVID waves and staffing shortages [11,12]. The purpose of this study is to evaluate SUO fellow surgical case logs for changes in case volume for the first graduates of the pandemic.

2. Methods

Deidentified national case log data for all graduating SUO fellows was obtained from the SUO Education Committee for graduates of 2017 through 2021. The SUO did not have complete data on the graduating cohort of 2021 at time of latest analysis (July 13, 2022) so the existing data for 35 of the 40 fellows was used. The SUO data consists of oncologic case logs that are stratified by type: retroperitoneal lymph node dissection (RPLND), nephrectomy (including radical and partial), cystectomy, and prostatectomy. Additionally, the surgical approach of open or minimally invasive surgery (MIS) is recorded. Case log data is self-reported and reviewed by the fellow's SUO program director on a semi-annual basis.

The clinical year for SUO fellows in most programs is the second year of their fellowship. Due to deidentified data we were unable to account for the few programs that vary in this regard, thus all graduates of academic year 2019 to 2020 were considered impacted by the initial phase of the COVID-19 pandemic. All 2020 to 2021 graduates had their clinical year either affected by the initial shutdowns or during subsequent COVID waves and healthcare staff shortages [11,12]. Fellows who performed their clinical year in academic years 2016 to 2017, 2017 to 2018, and 2018 to 2019 were combined into a pre-COVID cohort. Operative case volumes and surgical approaches were compared between the pre-COVID cohort and each subsequent individual COVID-affected cohort.

Medians and interquartile ranges (IQR) were calculated across all surgery subsets for each academic year and pre-COVID and COVID-affected groups. Assessment of normality was completed using Shapiro Wilkes test. Comparison of case medians was completed using Kruskal-Wallis with Dunn's pairwise test with Bonferroni correction for multiple comparisons. All significance levels were set at $P \leq 0.05$. Statistical analyses were performed using R (R Core Team, 2019) and graphs generated with Prism (GraphPad Prism 9).

3. Results

The case logs of 173 graduating SUO fellows of academic years 2017, 2018, 2019, 2020, and 2021 (35, 30, 35, 38, and 35 fellows per year respectively) were analyzed (medians and IQR shown in Fig. 1). Graduates of 2017, 2018, and 2019 were grouped into a pre-COVID cohort consisting of 100 fellows. Graduates of 2020 and 2021 were left as separate COVID-affected cohorts with 38 and 35 fellows per cohort, respectively.

The median and IQR for case totals and by surgery type are shown in Table 1. The pre-COVID cohort 191 median total cases were not statistically different from COVID-affected fellows with 172 in 2020 and 186 in 2021 ($P = 0.52$). There was no difference between open RPLND, open nephrectomies, MIS nephrectomies, open cystectomies, MIS cystectomies, open prostatectomies, or MIS prostatectomies (Table 1).

The number of total recorded MIS cases decreased for the first COVID-affected graduating cohort of 2020 compared to the pre-COVID cohort (92.5 vs. 135, $P = 0.002$) despite no differences in individual tracked MIS case categories (Fig. 1). The median number of MIS RPLND cases increased in the 2021 COVID-affected cohort compared to their 2020 COVID-affected counterparts (2 vs. 0, $P = 0.033$) but neither were statistically different from the pre-COVID cohort.

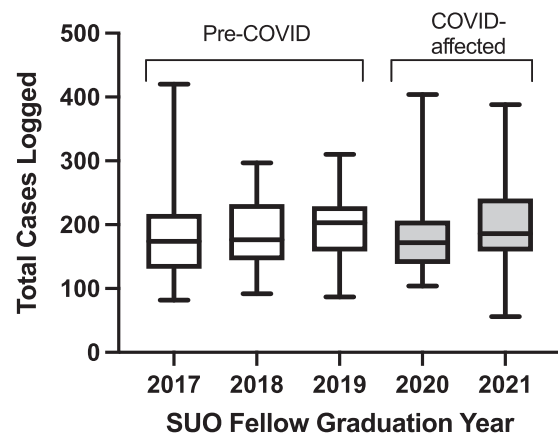


Fig. 1. Total cases logged per graduating class of SUO fellows from 2017 to 2021 (Whiskers represent minimum and maximum values; COVID-affected cohorts in grey; SUO - Society of Urologic Oncology).

Table 1

Median cases logged for pre-COVID and COVID-affected cohorts of graduating SUO fellows.

	Pre-COVID 2017–2019 (<i>n</i> = 100) median no. (IQR)	COVID-affected 2020 (<i>n</i> = 38) median no. (IQR)	COVID-affected 2021 (<i>n</i> = 35) median no. (IQR)	<i>P</i> value
RPLND open	8 (8)	11 (8.75)	9 (9)	0.12
RPLND MIS	1 (3)	0 (2)	2 (3.5)	0.028
Nephrectomy open	30 (26.5)	33 (14.75)	28 (22.5)	0.63
Nephrectomy MIS	36 (23.5)	24.5 (17.75)	33 (20.5)	0.07
Cystectomy open	24 (27.25)	26.5 (18)	18 (22.5)	0.85
Cystectomy MIS	9 (11.5)	7 (9.5)	6 (9)	0.86
Prostatectomy open	2 (13)	2 (8)	1 (6.5)	0.55
Prostatectomy MIS	54 (40)	59.5 (43)	55 (36)	0.71
Total MIS	135 (89.5)	92.5 (66)	110 (49.5)	0.001
Total cases	191 (76.5)	172 (66.5)	186 (78)	0.52

Bold values denote statistical significance at the $p < 0.05$.

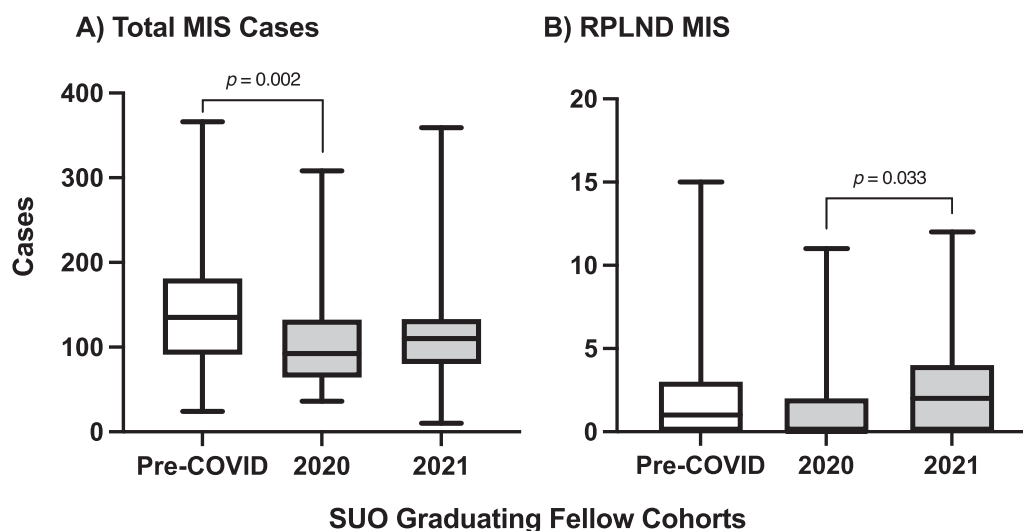


Fig. 2. Cases categories with statistically different medians between SUO fellow cohorts. (Whiskers represent minimum and maximum values; COVID-affected cohorts in grey; MIS – minimally invasive surgery; RPLND – retroperitoneal lymph node dissection; SUO – Society of Urologic Oncology).

4. Discussion

SUO fellows completing their clinical year during the initial phase of the COVID-19 pandemic had similar surgical case logs compared to their pre-COVID counterparts. Total operative volume and all tracked oncologic categories for both COVID-affected graduating years were similar to the cohort of the 3 previous years. These results were somewhat surprising as the initial COVID-19 wave in the US started in March 2020 and resulted in recommendations to limit elective surgeries, preserve hospital capacity and maintain personal protective equipment [1,3,4]. Some states provided further guidance by issuing temporary emergency declarations to stop elective procedures and office visits [13].

For SUO fellows in their clinical year, March through June 2020 encompassed over 25% of their surgical experience. National data from this time showed a drastic reduction in urologic cases to less than 50% of 2019 volume [11]. However, case numbers rebounded and were maintained at 2019

levels during the COVID wave of fall 2020 when there were fewer restrictions on elective surgery. There are few reports on how hospitals returned to full surgical capacity and reduced surgical backlogs. The ability to provide preoperative COVID testing, surgical prioritization systems, and increased operating hours were some of the strategies employed [14–16]. These strategies and the time dependent nature of many urologic oncology cases may have helped mitigate effects on SUO fellow case volumes.

We are also unable to identify rates of double scrubbing (2 trainees participating in the same case) from this data. The impact of double scrubbing on surgical trainees' education is not well described. Initially in the pandemic, surveyed residency program directors reported decreasing the number of trainees double scrubbing to reduce team exposure and preserve personal protective equipment [17]. Whether this occurred with SUO fellows or if following reinstatement of surgeries there was increased double scrubbing to make up for missed surgical volume is unknown.

There was significant debate and concern at the start of the pandemic about the risk of virus transmission from abdominal insufflation given previous documentation of aerosolized viruses in surgical smoke, including human papillomavirus (HPV), hepatitis B virus, and human immunodeficiency virus [18–20]. The clinical significance of these findings can be debated as there have been no documented cases of transmission for these viruses, although there are rare reports of gynecologic surgeons with significant occupational HPV exposure developing HPV related oropharyngeal disease [21].

Given concern for infection from insufflation, European Association of Urology Guidelines Office Rapid Reaction Group gave recommendations to minimize possible transmission risk if MIS procedures were performed but still stated surgeons should use the approach they are most comfortable with [22]. Subsequently, SARS-CoV-2 has been identified in abdominal insufflation samples, but there have been no documented cases of viral transmission from surgical aerosolization [23]. Whether urologists performed a higher rate of open approaches due to the theoretical risk is unknown. There has been a documented trend towards increased MIS approaches to urologic oncology [24]. The cohort of 2020 graduates did have statistically fewer total MIS cases compared to their pre-pandemic peers and did fewer MIS RPLNDs than the other COVID-affected cohort of 2021. The total MIS category captures all MIS cases, so may include non-oncologic cases as well as oncologic cases that aren't tracked individually such as adrenalectomies, inguinal or pelvic lymphadenectomies or ureteral cases. MIS RPLNDs remains a developing technique, as demonstrated by the median number performed by most SUO fellows, that may have paused initially during the pandemic before continuing to expand in adaptation. One hypothesis for the increase from 2020 to 2021 is that urologists may have preferred the more established open approach given the many uncertainties during the initial pandemic and then returned to the pre-pandemic trend of increasing use of the MIS technique. Despite the increase, over half of 2021 graduates performed 2 or fewer MIS RPLNDs, and 9 performed zero (data not shown). Otherwise, our data did not show a change in surgical approach among the other index oncologic cases.

We had hypothesized a decrease in MIS nephrectomies for COVID-affected fellows but there was no statistical difference among cohorts. This was surprising as urologic triage schemes allowed surgical deferral of cT1, and some cT2, renal masses during the height of the pandemic in addition to possible increased utilization of available non-surgical interventions [8]. There was not an increase in open approach as might be expected if the MIS approach itself was a concern as discussed above. It is possible these patients were prioritized upon resumption of surgery and minimized interruptions to fellows' training.

This study does have several limitations. The data was deidentified and thus effects on individual programs or

geographic regions more heavily hit by the pandemic is unknown. The deidentification also prevented analyzing the data by clinical year. A minority of programs are structured with the clinical year first followed by a research year, thus a few of the fellows that graduated in the COVID-affected cohorts were either not affected or affected differently than the rest of their cohort. As previously discussed, this data does not elucidate if fellow case volume was maintained following resumption of elective surgery due to increases in the practice of double scrubbing. If that occurred, it may have affected the surgical learning experience. Only oncologic surgical case volumes are tracked by the SUO and thus we were unable to assess the impacts on benign urology case volumes. Surgical case logs are self-reported by each individual fellow and may not encompass their entire surgical experience. Finally, while we do not have complete data on the most recent SUO graduates of 2021, our study includes the majority of that cohort.

Strengths of this study include a comprehensive assessment of case logs for all SUO fellows graduating from 2017 to 2020 and a majority of 2021 fellows. We were able to directly compare the first graduates of the pandemic to their predecessors. Our data provides reassurance that despite the significant difficulties faced by the first SUO graduating fellows during the COVID pandemic, overall surgical case volume remained relatively stable.

The full scope of pandemic impacts on urologic oncology remains to be seen. Fellows experienced educational changes outside of the operating room such as increasing telemedicine and virtual didactics. For patients, it has been reassuring that data suggests the postponement of MIS prostatectomies during the initial pandemic stages does not affect outcomes, but for other less indolent urologic malignancies, we may see patient presentation at higher stage [25,26].

5. Conclusion

The oncologic case volumes of COVID-affected SUO fellows graduating in 2020 and 2021 were minimally affected. There was a decrease in overall MIS cases, but not for tracked oncologic case categories, for fellows trained during the initial phase of the pandemic. This national deidentified data is relevant to the initial widespread shutdowns of March through June 2020, as well as subsequent COVID surges and staffing shortages affecting the following academic year. The possible effect of geographic differences or on individual fellows remains unknown.

Conflict of interest

The authors have no conflicts to report.

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