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The Impact of COVID-19 on Surgical Activity

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Abstract

Aim

This study aims to examine the impact of COVID-19 on surgical activity in a Model 3 Hospital.

Methods

A retrospective, observational study assessing data collected over a 3-month period (February to April) in 2019 and 2020.

Results

There was an overall reduction in surgical activity between 2019 and 2020. This impact was felt most acutely in the month of April where elective theatre and endoscopy procedures fell from 131 to 9 (93%) and 399 to 102 (74%) respectively. The number of emergency department admissions reduced from 534 to 408 (24%) and the number requiring surgical intervention fell from 166 to 122 (27%). Attendance at surgical outpatients fell from 1,211 to 677 (44%) between the 2019 and 2020. In April, attendance reduced from 456 to 52 (86%).

Discussion

This study has quantified the reduction in surgical department activity in our Model 3 Hospital. This reduction in scheduled and non-scheduled care could be extrapolated nationally to inform service planning, which will become increasingly challenged unless action to address the service deficit is taken soon.

Introduction

The severe acute respiratory syndrome – coronavirus 2 (SARS-CoV-2) and subsequent Covid-19 illness have a resulted in a pandemic presenting unprecedented challenges for health care services worldwide [1]. This has impacted on scheduled surgical services in particular and surgical bodies globally have been proactive in providing up to date resources and clinical guidance for surgeons in their jurisdictions [2,3]. The PanSurg collaborative project was created as a global hub for surgeons sharing experience and research [4].

The first confirmed case of Covid-19 in Ireland was on February 29th and the first death from the illness occurred on March 11th [5]. In most hospitals in Ireland, all non-urgent outpatient appointments and elective procedures have been postponed indefinitely [6]. The operating theatre environment presents high risk of transmission of SARS-CoV-2 due to aerosol generation from anaesthesia and intubation and the actual surgical procedure. Complex procedures also necessitate a large number of staff who require a large volume of personal protective equipment (PPE) which poses logistical and procurement challenges. Intercollegiate guidance on patient and staff safety as well as surgical prioritisation has attempted to address some of these issues [7].

Most operating theatres have developed protocols regarding testing of patients/staff, reducing numbers of people at intubation/extubation and prolonged periods between cases. These factors have combined to reduce capacity within the operating theatre [1]. Coupled with this, patients are concerned regarding presenting to hospital due to the risk of contracting COVID-19. It is still unclear how the risk of delayed presentations and delayed intervention will impact patients [8].

The aim of this study was to examine the impact of COVID-19 on surgical activity in a Model 3 Hospital. We compared surgical department activity over the same 3-month period in 2019 and 2020.

Methods

This was a retrospective, observational study assessing administrative data in a model 3 hospital in Ireland. Data was collected for 3 months, February to April (inclusive), in 2019 and 2020. In this hospital surgical outpatient clinics were running as normal up to the week beginning March 16th.

Data pertaining to outpatient clinics and inpatient admissions was retrieved from the i.Patient Manager System (iPMS) (Version 4.0.0) and data pertaining to elective and emergency operations was retrieved from the Surgical Audit Department in Wexford General Hospital (WGH). Data regarding elective endoscopy was retrieved from Endoraad Diver. Non-elective endoscopy was included in theatre procedures.

WGH is located in the south-east of Ireland. As a model 3 hospital it provides care for undifferentiated surgical patients [9]. It is a 280 bed hospital providing services to the people of Wexford, with a population of 149,722, as well as to people in the surrounding counties of Carlow, Kilkenny, Waterford and Wicklow [10]. There are 4 full time surgeons practising in WGH.

The latest available statistics from the Health Protection Surveillance Centre (HPSC) note 179 confirmed cases of Covid-19 in Wexford. The region has the lowest incidence rate nationally [11].

Results

Elective Activity

Elective theatre procedures fell from 376 in 2019 to 216 (43%) in the same time period in 2020. Elective endoscopy procedures fell from 1,140 to 743 (35%) in 2020. A breakdown with month-by-month figures is provided in table 1.

In terms of the waiting list for scheduled endoscopy, on March 12th, 2020 there were 3 urgent colonoscopies and 1 urgent OGD waiting to be assigned procedure dates. By May 5th, 2020 these had increased to 17 urgent colonoscopies and 17 urgent OGDs waiting to be assigned dates.

Table 1 – Elective activity

		2019	2020	% Change
February	Theatre Procedures	120	138	15%
	Endoscopy	356	365	3%
March	Theatre Procedures	125	69	-45%
	Endoscopy	385	276	-28%
April	Theatre Procedures	131	9	-93%
	Endoscopy	399	102	-74%
Total	Theatre Procedures	376	216	-43%
	Endoscopy	1,140	743	-35%

Elective major abdominal surgery (which includes all colectomies, small bowel resections and laparotomies) reduced from 15 to 9 (40%) in the study period between 2019 and 2020. The number of elective cholecystectomies and hernia operations reduced by 15 (29%) and 25 (60%) in respectively. Table 2 breaks down the 5 most common elective procedures.

Table 2 - Elective procedures

	Feb-19	Mar-19	Apr-19	Total	Feb-20	Mar-20	Apr-20	Total	% Change
Major abdominal surgery	5	3	7	15	4	5	0	9	-40%
Cholecystectomy	17	19	16	52	25	12	0	37	-29%
Hernia operations	12	10	20	42	11	6	0	17	-60%
Minor excision/biopsy	41	44	51	136	53	20	2	75	-45%
Ingrowing toenail operations	11	12	13	36	13	6	1	20	-44%

Emergency Activity

Emergency admissions fell from 534 over the 2019 study period to 408 in 2020 (24%). The number of emergency cases requiring operative intervention fell from 166 in 2019 to 122 in 2020 (27%). A breakdown is provided in table 3.

Table 3 – Emergency activity

		2019	2020	% Change
February	Admissions	151	161	7%
	Procedures	49	42	-14%
March	Admissions	209	131	-37%
	Procedures	57	39	-32%
April	Admissions	174	116	-33%
	Procedures	60	41	-32%
Total	Admissions	534	408	-24%
	Procedures	166	122	-27%

The number of emergency oesophagogastroduodenoscopies (OGDs) performed emergently fell from 32 to 12 in 2020, (63%). The number of major abdominal surgeries increased from 18 cases in 2019 to 24 in 2020 (33%). A breakdown of the most common emergency procedures is provided in table 4.

Table 4 - Emergency procedures

	Feb-19	Mar-19	Apr-19	Total	Feb-20	Mar-20	Apr-20	Total	% Change
Appendicectomy	7	9	17	33	12	4	13	29	-12%
Abscess incision & drainage	6	12	3	21	6	10	4	20	-5%
OGD	9	12	11	32	4	4	4	12	-63%
Major abdominal surgery	5	4	9	18	8	6	10	24	33%
Hernia operations	1	2	1	4	2	1	0	3	-25%

Outpatients Activity

1,211 patients attended for surgical outpatient appointments in 2019. In the same time period in 2020 this figure fell to 677 attendees (44%). In April the attendance fell from 456 to 62 (86%).

On March 12th, 2020 there were 591 patients awaiting a new outpatient clinic appointment. This figure increased to 609 (3%) by May 5th.

Discussion

This study has quantified a significant reduction in surgical activity in WGH as a consequence of the COVID-19 pandemic. WGH represents the typical Model 3 hospital and the findings from this study can reasonably be extrapolated across all Model 3 Hospitals nationally.

The study period was 3 months but the full impact of COVID-19 was only experienced for six weeks within this period and was most acutely felt during the month of April where theatre activity fell 93% and endoscopy activity 74%. There with no elective major abdominal surgeries, cholecystectomies or hernia operations carried out in April 2020. Overall, during the study period elective theatre procedures fell from 43% and endoscopy procedures fell 35%. The most common elective procedures fell by 29-60%.

The reduction in elective activity is largely accounted for by the cancellation of all non-urgent elective surgery and endoscopy. Consequently, there have been large increases in the numbers awaiting these procedures. Elective surgery and endoscopy for urgent cases are still proceeding, but not at a rate that can meet demand. While certain 'urgent' cases, such as the provision of some cancer services may be delayed, others cannot. Professional bodies and specialty organisations including the Royal College of Surgeons in Ireland and the National Cancer Control Programme have produced guidelines on these issues [12]. Nevertheless, patients understandably remain anxious regarding their ongoing treatment.

Surgical admissions via the emergency department fell 24% in the study period, which is consistent with media reports [8,13]. This worrying trend suggests patients are delaying presenting to emergency departments, a pattern comparable to the reduction in acute myocardial infarction and stroke presentations internationally [14,15]. However, there is little research assessing surgical admissions during the Covid-19 pandemic to "normal" operational periods.

The number of cases requiring surgical intervention, including endoscopic intervention fell 27%. The majority of this reduction is due to lower numbers of OGDs being carried out which are considered aerosol generating procedures and are high risk for Covid-19 transmission[16]. It is not clear whether the reduction is due to fewer admissions or a hesitancy of the surgical staff to perform these procedures.

Conversely, there was an increase in major intra-abdominal procedures carried out. Blanket restrictions on elective surgical activity were effectively implemented overnight resulting in an almost complete cessation of elective operating activity. As a result, a number of patients awaiting time sensitive operations were admitted emergently and their operations were thus carried out in an emergency setting leading to the overall increase in the number of emergency major abdominal procedures undertaken. If these cases were excluded we would likely have seen a reduction in these figures correlating to data from other jurisdictions [17,18]. As the pandemic has progressed measures have been put in place to allow the return of elective surgical activity [19].

During the study period, surgical clinic attendance in 2020 declined 44%, with an 88% fall in April. The number of patients waiting to be seen in outpatients between March and May 2020 increased from 591 to 609 (3%).

At the end of the study period the national surgical outpatient waiting list numbers had little changed as a consequence of the Covid-19 pandemic. Numbers waiting for hospital outpatient appointments in Ireland reached record highs in 2019. In April 2019 the National Treatment Purchase Fund (NTPF) identified 33,386 patients awaiting general surgical outpatients' appointments [20]. In April 2020, this figure increased to 33,525 (0.4%) awaiting general surgery appointments, probably reflecting the dramatic decrease in general practitioner (GP) referrals. The most recent waiting list data from the NTPF identifies 40,670 awaiting general surgical outpatients' appointments.

Surgical activity continued apace during February and well into March 2020, with the starkest reductions in activity seen in April 2020. Almost overnight, all non-urgent scheduled activity was cancelled, coinciding with rapidly evolving government enforced social restrictions.

The reduction in surgical activity as a result of Covid-19 along with the existing backlog of patients waiting for elective surgery and unmet demand in outpatients' appointments will all put future health services under further stress. Reinstating surgical services will be complex and will require a cohesive, multidisciplinary approach [21]. The "new normal" will require attention to patient and staff safety. Issues such as Covid-19 testing prior to surgery and endoscopy, staff Covid-19 testing, social distancing within hospitals and theatre and endoscopy suite sterilisation all require active consideration [16,21]. The implementation of agreed care pathways and increased access to diagnostics for GPs may reduce the number of patients needing outpatient review and increase the numbers suitable for see and treat style clinics [22,23].

Our study provides clear data regarding the reduction in scheduled and non-scheduled surgical activity compared to normal and the data from this study could be extrapolated nationally to inform service planning in the future. Clearly, capacity planning will become increasingly challenged unless action to address the service deficit is taken soon [24].

This data suggests that there will be a sharp rise in waiting lists by the end of the Covid-19 pandemic. It is unclear how long before we can reopen outpatients but a more substantial use of virtual clinics and patient reviews will be required [21].

The limitations of this study are those inherent to the use of administrative data. The accuracy of the data is dependent on information technology (IT) systems and secretarial/administrative staff. Furthermore, this data does not present any findings pertaining to outcomes for patients.

The Covid-19 pandemic has evolved rapidly with focus on limiting the spread of the disease. This has had a major impact on the provision of surgical services in Ireland and globally. Surgical care is a major element of a functioning health service and we must be proactive in creating solutions to manage the increased numbers of patients waiting for access to our services [25].

Declaration of Conflicts of Interest:
There are no conflicts of interest.

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