



# Role of our Emergency Surgical Ambulatory Clinic in COVID-19 Pandemic

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## Abstract

**Introduction:** Once COVID-19 pandemic has been declared in March 2020, the health care organizations started to adapt new polices to face this dynamic challenge and the healthcare professionals had been trained rapidly to implement the new plans.

**Aim:** To illustrate the emergency surgical care provided during COVID pandemic and to measure the outcomes.

**Material and Methods:** A total of 1,333 patients were seen during the study period and included in the cohort. Of these, 782 patients were in study Group A (COVID-19 time) and 551 patients belong to study Group B (pre-COVID-19 era).

**Results:** In the COVID-19 time here is a net increase in the total number of the patients seen in the unit by about 30% as compared with the same period in during the pre-COVID-19 era.

Referrals redirected from SAU (Surgical Ambulatory Care Unit) is considerably smaller in Group A (3.2% compared to 27.2% in Group B) as ESAC (Emergency Surgical Ambulatory Clinic) reviews all the A&E referrals primarily. A higher number of patients has been referred from A&E patients were reviewed in Group A (86.6% compared to 50% in Group B), however proportionately more discharges occurred in Group A (81.9% compared to 66.5% in Group B).

**Conclusion:** Surgical Care Unit re-organization is needed and suggested to ensure the delivery of surgical patient's management with a high standard of care during the COVID-19 pandemic; this can be done through fair and appropriate allocation of resources according to the need. Adaptation of alternative safe treatment protocols as conservative treatment rather than surgery is recommended in those patients who can have surgical treatment be omitted safely.

**Keywords:** COVID-19; Abdominal pain; Non-operative management; Surgical ambulatory care

## Introduction

The COVID-19 outbreak started in Wuhan, China in December 2019 and before long (in a while) significantly challenged the entire world [1]. The causative agent is SARS-COV2 (severe acute respiratory syndrome type 2 virus). It is an envelope, single stranded RNA virus (Figure 1), it has four major surface proteins which play major part in its infectivity: Spike protein (S), Membrane protein (M), Envelope protein (E) and the Nucleocapsid protein (N).

The (S) spike glycoprotein mediates viral membrane receptor binding and facilitates virus entry into the host cells through endocytosis, with help of ACE2 receptors triggering tissue damage mainly in the respiratory system [2]. On January 30<sup>th</sup>, 2020, it became a Public Health Emergency of International Concern requiring immediate measures to thwart the spread of the virus. The World Health Organization (WHO) on March 11<sup>th</sup>, 2020 declared COVID-19 a pandemic, with over 118,000 cases of the viral illness in over 110 countries and territories with further risk of global spread [3].

In the United Kingdom, the first two cases of COVID-19 were confirmed on January 31<sup>st</sup>, 2020 with significant surge impending [4]. The Government has published its action plan for dealing with COVID-19 in early March 2020 with the possibility that this could be a severe prolonged pandemic as experienced in 1918. This includes cancelling big festivals like BBC Big Weekend & 50<sup>th</sup> Glastonbury Festival to avoid overcrowding, military forces to support public services, and

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high-risk groups such as pregnant women, people over the age of 70 and those with certain health conditions are advised self – isolation and eventually imposition of lockdown announced on March 23<sup>rd</sup>, 2020 [5].

Additionally, The Prime Minister announces funding for research into vaccine and rapid diagnostic tests. Health Secretary has pledged to ensure daily deliveries of Personal Protective Equipment (PPE) to frontline workers and a temporary hospital (NHS Nightingale Hospital London) with potential capacity of 4000 beds was opened to treat COVID-19 patients. Specialty Specific Guidance have been published from the NHS England, Royal Colleges and its Associations to support the hospitals in the management of COVID-19 patients and more specifically surgical patients [6,7].

### Guidance

The principles behind all surgical guidance are the following:

1. Essential and emergency surgical care needs to be provided with minimum inconvenience to the NHS.
2. Surgeons might need to work outside their specific area of training and expertise to support NHS as per the famous quote by Dr. Daniele Macchine, Bergamo, Italy March 09<sup>th</sup>, 2020.

“.....and there are no more surgeons, urologists, orthopedists, we are only doctors who suddenly become part of a single team to face this tsunami that has overwhelmed us” [8].

Our Emergency Surgical Ambulatory Clinic has implemented significant changes in its practice to incorporate the above guidance. This study is to illustrate the emergency surgical care provided during COVID pandemic and to measuring the outcomes.

### Study design

This is a prospective service evaluation study designed with one group (Group A) before the COVID times but similar period i.e. March 2019 to July 2019 and the other group (Group B) during COVID times from March 2020 to July 2020. The study was approved by the Research and Ethics Committee of the SUFT.

**Surgical unit:** South end University Hospital (now part of Mid Essex Hospitals Trust) is a major acute teaching hospital in Essex. Surgery department consists of elective and emergency unit. The emergency department includes Surgical Assessment Unit (SAU), Emergency Surgical Ambulatory Clinic (ESAC) and Emergency surgical theatres which runs 24 h a day. Emergency on-call cover is provided by a dedicated Consultant Surgeon (SOW – Surgeon of the Week) during the day time (8 am to 6 pm) with overnight support from a second consultant surgeon on a rolling Rota. The weekend cover is provided by one consultant (SOWe – Surgeon of the Weekend) from Friday 8 am to Monday 8 am with his dedicated junior team. Surgical Assessment Unit is staffed with surgical juniors for clinical assessment and supervised by the SOW during weekdays and SOWe during weekend.

**ESAC (Pre-CVOID):** In Pre-COVID times, ESAC is an area adjacent to the Surgical Assessment Unit with one consulting room, one administration room and one assessment room for the surgical navigators. It is staffed with one ward clerk and two specialist nurse practitioner from 9 am to 6 pm and one dedicated consultant surgeon from 1 pm to 5 pm Monday to Friday. The main aim was to run efficient acute surgical services and avoid unnecessary admission to the unit. ESAC is for patients who has acute surgical problems and

fulfils the following criteria. They are suspected to have acute surgical illness but albeit well enough to remain in a chair while waiting for assessment and they are not of extreme ages (less than 70 and more than 16 years of age). They are patients referred from either Emergency Department (ED) doctors or General Practitioners (GPs) in the practice or in Out of Hours services. They can also be the patients seen by the night surgical team who can be safely discharged home to return to this clinic the next day. ESAC services have good access to rapid testing of bloods and urine and agreed for fast track ultrasound on the same day and CT scan either the same day or the following day.

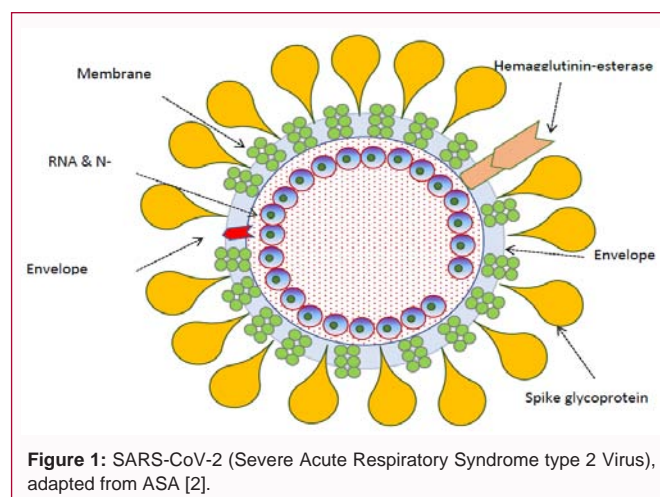
**ESAC (COVID):** As part of COVID measures, ESAC services were relocated closer to Emergency Department but still had access to all rapid diagnostic facilities. It was managed by two Consultant Surgeons every weekday and one Consultant Surgeon over the weekend. The services provided were the following:

1. Extended his acceptance of patients from all referring bodies including nurse practitioners in the community and triage nurses and junior doctors from ED.
2. Review of post-operative patients who could be discharged on the same day after certain surgical procedures.
3. Wound review of chronic patients on a regular basis.
4. Assessment of acute surgical patients who are treated conservatively as per national surgical guidance.
5. Review of patients with follow up investigations.

Concisely, ESAC services were extended from dispensing acute surgical care services to do most of the essential surgical services in the absence of elective outpatient clinics (Figure 1).

### Materials and Methods

The data collection period was during reallocation of ESAC services to support other emergency services during COVID times and to analyse this effectively, similar period of data during pre COVID times was collected to represent as control group. Group A consists of data collected on the patients reviewed in ESAC during March 2020 to July 2020 and Group B consist of data collected on the patients presented to ESAC during March 2019 to July 2019. The cohort included total number of 1,333 patients who were seen in ESAC during the study period.



**Table 1:** Patient demographics, clinical input, investigations and outcome.

Characteristics	Variables	Group A N (%)	Group B N (%)	Outcome during COVID
Total no of patients		782	551	↑
Gender	Male	373 (48%)	185 (34%)	↑
	Female	409 (52%)	366 (66%)	↑
Age	Median			
	<50	456 (58.5%)	332 (60%)	↑
	51 ≤ and <65	155 (19.9%)	103 (19%)	↑
	65 ≤ and <80	132 (16.9%)	90 (16.0%)	↑
Referral sources	>81	26 (5.0%)	37 (4.7%)	↓
	GPs	236 (30.2%)	197 (35.8%)	↑
	A&E	408 (52.2%)	17 (3.1%)	↑
	SAU	25 (3.2%)	150 (27.2%)	↓
	Consultants	43 (5.4%)	75 (13.6%)	↓
Types of referrals	Others	70 (9.0%)	86 (20.4%)	↓
	New	677 (86.6%)	277 (50%)	↑↑
	Planned review	102 (13%)	8 (1%)	↑↑↑
	Ward review	NA	177 (32%)	NA
Investigations	Review after surgery	NA	14 (3%)	NA
		N=677	N=277	
	Bloods	324 (47.9%)	249 (89.9%)	↑
	X ray	21 (3.1%)	14 (5.1%)	↑
	Ultrasound	61 (9.0%)	163 (58.8%)	↓↓
	CT	129 (19.1%)	23 (8.3%)	↑↑↑
Duration in ESAC	MRI	4 (0.6%)	0 (0%)	↑
		N=677	N=277	
	<2 h	276 (40.8%)	82 (29.7%)	↑
	2-4 h	143 (21.1%)	113 (40.9%)	↑
	4 h - 6 h	35 (5.2%)	19 (6.9%)	↑
	>6 h	15 (2.2%)	2 (0.7%)	↑
Outcomes	NDA	208 (30.7%)	60 (21.7%)	↑↑↑
		N=677	N=277	
	Discharged	520 (66.5%)	451 (81.9%)	↑
	Admitted	150 (19.2%)	80 (14.5%)	↑↑
	Taken to theatre	38 (4.9%)	37 (6.7%)	↑
Planned review	77 (9.8%)	105 (19.1%)	↓	

## Results

A total of 1,333 patients were seen in ESAC during the study period. Of these, 782 patients were in study Group A and 551 patients belong to study Group B. In comparing pre-COVID-19 era and during COVID-19 time, there is a net increase in the total number of the patients seen in the unit by about 30% during the same period. The demographics of the patients, clinical input, investigations and outcome are shown in Table 1. The Male:Female ratio is nearly equal in Group A compared to higher number of female attendance in Group B. Age distribution is reasonably the same during both periods with higher of patients from the young age. GP referrals to ESAC steadily remained similar in both groups (30.2% in Group A compared to 35.8% in Group B) but significantly higher number of A&E patients were reviewed in Group A. Referrals redirected from SAU is

considerably smaller in Group A (3.2% compared to 27.2% in Group B) as ESAC reviews all the A&E referrals primarily. Other mode of referrals was charted in the Table 1. Significantly high number of new referrals was reviewed in Group A (86.6% compared to 50% in Group B). In Group A, only half the number of patients had blood tests and the rest were assessed clinically and discharged. However in Group B, almost all new referrals (89.9%; 249/277) had blood tests during their initial consultation. Only 9% of patients underwent ultrasound investigations in Group A compared to 58.8% in Group B but there has been a significant increase in the number of CTs performed as per recommendations (from 8.3% to 19%). Two fifths of the patients are discharged within two hours of their consultations in Group A (40.8%) and around two third of patients were discharged with in 4 h of their attendance to the ESAC department (61.9%). Similar

**Table 2:** Clinical presentation of all patients.

Symptomatology	Group A N=782 (%)	Group B N=551 (%)	Outcome during COVID
Abdominal pain	307 (60.6%)	138 (48.8%)	↑
Abscess	65 (12.8%)	39 (13.8%)	↑
Hernia	27 (5.3%)	22 (7.8%)	↑
Skin infection	22 (4.3%)	11 (3.9%)	↑
Testicular pain	18 (3.6%)	3 (1.1%)	↑↑
Bleeding per rectum	17 (3.4%)	11 (3.9%)	↑
Biliary Colic	11 (2.2%)	9 (3.2%)	↑
Wound review	10 (2%)	28 (9.9%)	↓
Hematuria	9 (1.8%)	0 (0%)	↑
Fistula in ano	6 (1.2%)	3 (1.1%)	↑
Hemorrhoids	5 (1%)	7 (2.5%)	↓
Pilonidal Sinus	4 (0.8%)	2 (0.7%)	↑
Pancreatitis	4 (0.8%)	4 (1.4%)	-
Drain review	2 (0.4%)	6 (2.1%)	↓

number of patients were discharged in both groups (520 in Group A and 45 in Group B) but proportionately more discharged occurred in Group A (81.9% compared to 66.5%). There were some increase in the percentage of patients admitted from ESAC (19.2% compared to 14.5%) in Group A but the percentage of patients taken to theatre is slightly less (4.9% compared to 6.7%) but these variations are not statistically significant.

Patients predominantly present with abdominal pain in both groups (60.6% in Group A and 48.8% in Group B), the second commonest presentation being for the treatment of abscesses. There has been threefold increase in the number of patients presented with testicular pain in Group A (3.6% vs. 1.1% in Group B). There has been no significant increase in the number of patients with hernia, bleeding per rectum, biliary colic or haemorrhoidal symptoms during COVID pandemic.

## Discussion

This study demonstrates the extended service provided by the emergency surgical team during COVID-19 pandemic. Analyzing the data clearly shows that there is a significant increase in the number of patients seen in the Emergency Surgical Ambulatory Clinic. It is important to acknowledge that the number does not truly reflect the actual increase in number because it is well documented that the number of patients attending A&E was less during COVID times. The health foundation [9] stated that there is a 48% drop in patients attending A & E major units in April 2020 alone compared to the same time in April 2019. This clearly shows the increase in number of patients in ESAC has given more support to the A&E department to concentrate their care and services to COVID patients. Studies have shown the incidence of abdominal pain is higher in younger women of child bearing age. This is predominantly due to the higher incidence of Non-Specific Abdominal Pains (NSAP) and gynecological pathologies [10]. Our study shows the number of referrals from A&E during COVID times is significantly increased from 3.1% to 52.2%. During normal times (pre-COVID), A&E referrals are assessed by ED doctor and discharged either to see GP or a follow up with surgeons and those who are unwell will be referred to the on-call surgical team for admission, hence showing minimal referral to ESAC. However, during COVID times as the patients who attend A&E are directly

referred to the ESAC unit, the number is understandably higher (>50%). This number indirectly shows the general workload of our A&E department on surgical patients during normal times and explicitly demonstrates our role of releasing these ED doctors to attend to the sick patients with COVID related illnesses.

Only half the number of patients seen in ESAC during COVID times required blood tests as part of their assessments (47.9% compared to 89.9%). This strongly suggests the efficiency of our consultant led ESAC services. There is a significant increase in the number of CT investigations during COVID times (8.3% to 19.1%). There are multiple reasons attributed to this rise. Firstly, with less number of COVID tests being available at the start of the pandemic, patients with lymphopenia in their blood tests are subjected to CT to rule out covid related infection. Additionally, CT has been considered as an alternative diagnostic tool for acute abdomen instead of laparoscopies in view of the rising initial concerns with the safety of laparoscopy. Finally, CT has been recommended as an investigation of choice for patients even with definitive diagnosis of acute appendicitis to see whether this could be treated with non-operative management [11]. One of the useful temporary safety measures adapted to ensure safe management of COVID-symptoms-free healthy patients attending the surgical units is to create a COVID-free hub. This may involve coordination with the local community hospitals as well as the independent health care sectors. This will allow a better use of limited resources and minimise the risk of exposure to protect patients as well as the workforce also it is crucial to lower the risk of nosocomial infections, in particular Patient-to-Staff-to-Patient transmission [2,12].

## Conclusion

COVID-19 pandemic is a global health crisis and which creates a real challenge to the health professionals who are facing a highly dynamic circumstances. Surgical Care Unit re-organization is needed and suggested to ensure the delivery of surgical patient's management with a high standard of care during the COVID-19 pandemic; this can be done through fair and appropriate allocation of resources according to the need. Adaptation of alternative safe treatment protocols as conservative treatment rather than surgery is recommended in those patients who can have surgical treatment be omitted safely.

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