EXPRESS COMMUNICATION

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Bariatric Surgery is Safe During COVID-19 Pandemic

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ABSTRACT

Background: The Coronavirus Disease 2019 (COVID-19) pandemic has massively affected bariatric surgical practises across the world.
Aim: This report aims to show the effects of the pandemic on bariatric practices in the UK during the early phase of the pandemic.
Methods: Bariatric surgeons in United Kingdom (UK) were contacted; seven bariatric units and 20 collaborators agreed to participate in this project. The data includes patients' demographics, type and number of operations, bariatric endoscopic procedures, management of complications, emergency and revisional bariatric surgery. Statistical analysis was used to assess the differences among the categories and to compare the data to the 6th report outcomes provided by British Obesity and the Metabolic Surgery Society 2017–2018 (NBSR). Further analysis of mortality between pre pandemic era and June 2020-June 2021 was performed.
Results: A total of 430 bariatric procedures were conducted from 1 January 2020 to 31 March 2020 in seven hospitals in UK. The mean age of the patients was 43.3 years. The mean body mass index was 46.75 kg/m2. 314 (73%) of the patients were women and 116 (27%) were men. The following procedures were performed: 118 (27.4%) Laparoscopic Sleeve Gastrectomy (LSG), 114 (26.5%) One Anastomosis Gastric Bypass (OAGB), 76 (17.6%) Roux En-Y Gastric Bypass (RYGB), 61 (14.18%) Gastric Balloon and 15 (3.5%) Adjustable Gastric Band. 176 bariatric endoscopy procedures were performed for different indications. 26 (6.04%) revisional surgeries and 20 (4.6%) emergency bariatric surgeries were performed. 24 (5.58%) patients had Grade I–IV Clavien–Dindo complications. No mortality was reported. There was a significant difference in the number of operations for each of LSG, RYGB and OAGB in these seven hospitals compared to the data provided by the British Obesity and Metabolic Surgery Society (BOMSS) 2017–2018 .Only one patient was diagnosed with COVID-19, who was successfully treated and discharged home. Only one mortality was reported during June 2020 untill June 2021.There was no significant difference in moratlity between pre and post pandemic, $p>0.5$.
Conclusions: This data reveals safe bariatric practices during the early phase of COVID-19.
Key words: adjustable gastric band, gastric balloon, laparoscopic sleeve gastrectomy, one anastomosis gastric bypass, roux en-Y gastric bypass

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INTRODUCTION

The Coronavirus Disease 2019 (COVID-19) crisis has had a negative impact on patients with obesity and who have undergone bariatric surgical procedures across the world with reported morbidity and mortality. It led to a halt in the elective weight loss and metabolic surgeries (1-3) at the peak of the pandemic. Emergency surgeries, including bariatric surgeries, were performed during the early stage of the pandemic when surgeons weren't fully aware of the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) being present in their community. Both the reverse transcription polymerase chain reaction (RT-PCR) and chest computed tomography (CT) scan were used to provide the COVID-19 diagnosis with a diagnostic accuracy of 71% and 98%, respectively (4,5). Only eight cases of COVID-19 were published on bariatric patients during the early phase of the pandemic (6-8).

On 14 April 2020, the International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO) published a paper which recommended that all elective surgical and endoscopic cases for metabolic and bariatric surgery should be postponed during the pandemic (9). On 20 March 2020, the British Obesity and Metabolic Surgery Society (BOMSS) published a letter stating that all elective bariatric surgeries in both the National Health Service (NHS) and private sectors would effectively cease for the next three to six months to help the NHS cope with the extraordinary pressures caused by the COVID-19 outbreak. There are potential risks of delaying bariatric and metabolic surgeries (BMS) (10). The Diabetic Surgery Summit (DSS) has suggested to prioritise BMS for certain groups of patients with conditions which are likely to deteriorate quickly, so that urgent surgeries should be performed within 30 days. For patients with semi-urgent conditions – i.e. symptoms which could cause severe pain or dysfunction – the surgery should be performed within three months. For examples: Body Mass Index (BMI) > 60 kgs/m^2, more than two metabolic conditions, severe obesity hypoventilation syndrome, severe obstructive sleep apnoea (OSA) heart failure stage c, chronic kidney disease stage 3 or 4, HBA1c >8%, on two more medications, insulin use, cardiovascular morbidity, non alcoholic steatohepatitis, >5 years of duration of diabetes. Non-urgent elective surgery is planned for patients with mild or moderate conditions which are unlikely to cause substantial discomfort, dysfunction or harm if treated within one year (11). However, after a few months, BMS was resumed in the UK, performed in safety, but it needs to be understood whether the bariatric population is more at risk (12). In planning to re-start BMS, the BOMSS recommends that patients self-isolate two weeks before and after surgery, a COVID-19 screening test is performed 72 hours before the operation and adding a specific consent statement explaining the risk of catching COVID-19 during hospitalisation, along with being admitted to the intensive therapy unit (ITU), intubation and death (www.bomss.org.uk) (12).

Patients with obesity who encounter COVID-19 are at a high risk of developing a severe disease and being admitted to the ITU (13-15). The Intensive Care National Audit and Research Centre (ICNARC) (16) confirms that patients who suffer from obesity and encounter COVID-19 are more likely to be admitted to the ITU, need invasive respiratory support and die. These risks may be due to patients' defective immunity, obesity-related comorbidities (diabetes, cardiovascular disease, cerebrovascular disease, obstructive sleep apnoea OSA, Vit D deficiency and sarcopenia), ACE2 receptor status, the renin-angiotensin-aldosterone system (RAAS) vasoconstriction, increased blood pressure, oxidative stress, inflammation, endothelial dysfunction, maladaptive immune modulation and fibrosis (17,18).

It is not clear whether the overexpression of ACE2 receptors in a large mass of adipose tissue (19) for which the COVID-19 affinity is much larger than lung ACE2 receptors (20) contributes to the worse outcomes in patients with obesity. In fact, there is evidence which contradicts the above theory, as children and women possess a large number of ACE2 receptors yet tend to develop a mild form of the COVID-19 infection (21).

Concerns of BMS in COVID-19 times was justified as obesity is known to be a high risk factor for ITU stay and mortality with COVID-19. At the same time, some authors have suggested that certain groups of patients seeking BMS should be prioritised (11). Others have however argued that those with more than 2 co-morbidities should be avoided probably because of concerns with regards to operating on high risk patients. However there were patients who underwent BMS inadvertently around the world during the early phase of the pandemic before the extent of the pandemic became fully obvious in different parts of the world. That group of patients can help us understand the safety outcomes with BMS during the pandemic. That is why we conducted this study. The aim of this study was to assess the outcomes of BMS likely to have been performed during the early phase of the COVID-19 pandemic in the UK before we became aware of the full extent of the pandemic.

METHODS

Setting

Seven hospitals in the UK managed by the NHS and the private sectors.

Design

A retrospective cohort study conducted on patients who underwent BMS from 1 January 2020 to 31 March 2020. The study is conducted in line with the STROSS statement (22). Further analysis of mortality is conducted to compare pre pandemic and post pandemic June 2020-June 2021 NBSR data.

Participants

UK bariatric surgeons were invited to participate in this study through bariatric email groups, informal emails and personal contact; 20 collaborators from 7 bariatric units agreed to submit anonymous patients' data for analysis.

Study size

The study size was determined by the enrolment of bariatric units in the UK. No formal sample size calculation was conducted. The 430 patients' data were compared to the data of 6009 patients included in the BOMSS audit for 2017–2018. The reported consolidated data were similar to the UK National Bariatric Surgery Registry (NBSR) data and therefore an ethical approval was not required.

Data source

The collaborators of the participating seven bariatric units submitted the anonymous data to the study coordinator and project lead (AH).

Variables

The data includes patients' demographics, type and date of operations, bariatric endoscopy procedures, early and late complications using the Clavien–Dindo system, management of complications, emergency and revisional bariatric surgeries, COVID-19 diagnosis, hospital stay and follow-up data. The number and type of operations were compared to BOMSS data as well as recent NBSR national data June 2020 - June 2021, (https://www.bomss.org.uk/clinical-outcomes-2019-2020) (see *table 1*).

Bias

The participants were asked to submit data of consecutive patients' during study period and no selection bias was identified. All the outcomes, including the complications, were assessed by the respective bariatric team at each bariatric unit.

Follow-up

The study aimed to report perioperative outcomes. The patients were followed up in the bariatric clinic as per the local bariatric protocol in the early months, however virtual assessment through phone calls was used to assess the patients after cancellation of all planned follow up clinic appointments. Some units provided the perioperative follow up and others reported longer follow up.

Statistical analysis

Descriptive statistics were used for the continuous parameters to measure the central tendency and conduct the variability-test, while Z statistics were used to assess the differences between the categories and to compare the data with the BOMSS audit data 2017–2018. The Social Sciences Statistics software was used (www.socscitatistics.com). The confidence interval was set at 95%, and a p-value of <0.05 was regarded as significant.

RESULTS

Participants

A total of 430 bariatric procedures were performed from 1 January 2020 to 31 March 2020 at seven participating hospitals.

The mean age of the patients was 43.3 years. The mean body mass index was 46.75 kg/m^2. Approximately 73% (n=314) of the patients were women. A total of 384 primary procedures were performed, compared to the 5,421 procedures performed in the BOMSS data with a

Table 1 - The demographic features, the type and number of bariatric /metabolic surgery during January-March 2020

Mean age	43.3
Mean BMI	46.75
Women	314 (73)
Men	116 (27)
RYGB	76 (17.6)
OAGB	114 (26.5)
LSG	118 (27.4)
AGB	15 (3.5)
GB	61 (14.18)
Revisional surgery	26 (6.04)
Emergency laparoscopy for bariatric complications	20 (4.6)
Total	430 (100)

p-value of 0.022. Twenty six revisional surgeries were performed, compared to the 588 operations performed in the BOMSS audit with a p-value of 0.022. The following procedures were performed: 118 (27.4%) Laparoscopic Sleeve Gastrectomy (LSG), 114 (26.5%) One Anastomosis Gastric Bypass (OAGB) and 76 (17.6%) Roux En-Y Gastric Bypass (RYGB).

There was a significant difference in the individual number of the three commonest procedures (LSG, OAGB and RYGB). Compared to the BOMSS data, the p-value was <0.00001, <0.00001 and 0.02574 for RYGB, OAGB and LSG, respectively (please see *table 2* and *3*).

Sixty one (14.18%) Gastric Balloon and 15 (3.5%) Adjustable Gastric Band were performed. A total of 176 bariatric endoscopy procedures were performed for different indications. 26 (6.04%) revisional surgeries and 20 (4.6%) emergency bariatric surgeries were performed. Two (10%) laparoscopic exploration of jejuno-jejunostomy (J-J) obstruction were performed following RYGB, revision of J-J and vented gastrostomy, the overall incidence was 2.63%, three diagnostic laparoscopies for abdominal symptoms following RYGB (15%), one (1.3%) laparoscopic washout and drainage of a leak following RYGB, one (1.3%) gastro-jejuno-stomy G-J dilatation for stricture following OAGB, three (15%) GB removal, the overall incidence of 4.9%, two (ten%) laparoscopic closure of internal hernia. Eight (40%) AGB removal for slippage and one (five%) laparoscopy and drainage and washout for leak following RYGB (see *table 4*).

There were 24 (5.58%) Grade I–IV Clavien–Dindo complications. No mortality was reported. Only one patient was diagnosed with symptomatic COVID-19 in the perioperative phase and was successfully cured and discharged to go home (see *table 3*). There were no postoperative admissions because of COVID-19.

As shown in *table 2*, there were six complications following RYGB: one rhabdomyolysis, one melena, one sepsis, one leak and two obstructions at the J-J anastomosis. These were treated by laparoscopy, venting gastrostomy, revision of the J-J anastomosis, drainage and antibiotics. There were three complications following the LSG: pneumonia not related to COVID-19, abdominal wall haematoma and melena. These were all treated conservatively. There were three complications of intolerance following GB, which were managed by GB removal. There was one GJ stricture following OAGB, which was treated by dilatation. There were an additional 11 Grade I–III complications.

There was only one mortality out of 3,311 (0.003) patients in June 2020 - June 2021 post pandemic period. This was not statistically significant p value > 0.5.

16 March 2020 was the first day in which PPE was used. The elective bariatric surgery was halted from 5 March 2020 to 22 March 2020. Two bariatric and six general surgeons in the seven enrolled departments tested positive for COVID-19. Fortunately, all have recovered well.

Table 2 - The Calvien-Dindo classification of complications of 430 patients underwent bariatric / metabolic surgery during January-March 2020

Total	No (%)
	430 patients
Grade I	8 (33.33)
Grade II	1(4.16)
Grade III	
IIIa	5 (20.83)
IIIb	9 (37.5)
Garde IV	
IVa	1 (4.16)
IVb	0
Grade V	0
Total	24 (100)

Table 3 - The types and number of operations and the mortality of 430 patients who underwent bariatric/metabolic surgery during January-March 2020 are compared to BOMSS data of 2017-2018

Character	Bariatric surgery during Jan-Mar 2020, No (%)	BOMSS audit 2017-2018, No (%)	P-value
Primary operations	384(93.65)	5421(90)	0.022
Revisions	26(6.35)	588(10)	0.022
RYGB	76(22.75)	2059(38)	<0.00001
OAGB	114(34.13)	417(7.7)	<0.00001
LSG	118(35.32)	2493(46)	0.02574
30-day Mortality	0	3	0.6818

Table 4 - Emergency bariatric surgery during January-March 2020

Complication	Procedure	No (%)	Overall incidence %
JJ obstruction(RYGB)	Revision of JJ anastomosis	2(10)	2.63
GJ obstruction(OAGB)	Dilatation	1(5)	0.8
Unexplained abdominal pain	Diagnostic laparoscopy	3(15)	3.9
Internal hernia	Closure	2(10)	2.63
Intolerance for GB	GB removal	3(15)	4.9
AGB slippage	AGB removal	8(40)	53
Leak(RYGB)	Laparoscopy, drainage	1(5)	1.3
Total			20 (100)

DISCUSSION

The most important finding of this study is no mortality of BMS during the early phase of the COVID-19 pandemic, from 1 January 2020 to 31 March 2020. The zero mortalities observed in this period replicated the safety profile of bariatric surgery although the dataset is relatively small. There was only one mortality during June 2020 - June 2021 out of 3,311 patients who underwent weight loss surgery. This 0.003 % mortality is negligible and in comparison, to the pre pandemic era, it did not show any significance, p value >0.05.

Only one high-risk bariatric patient was diagnosed with COVID-19 after LSG and was successfully treated using conservative methods. The patient had significant comorbidities, including hypertension, moderate obstructive sleep apnoea (OSA) not on continuous positive airway pressure (CPAP), end-stage renal disease, anaemia and generalised anxiety/panic disorder. She had negative RT-PCR on two preoperative occasions, 12 and 13 March 2020, but tested positive on 25 March 2020 and was confirmed again by a CT scan.

The first reported COVID-19 case in the UK was on 31 January, in York (23). It is possible that asymptomatic and undiagnosed COVID-19 cases were present before 31 January 2020 as the cases of several members of a choir in Yorkshire had suffered Covid-19-like symptoms shortly after the partner of one of the choir members returned from a business trip to Wuhan, China, on 17 or 18 December 2019.

We have compared this paper's results with those of the national BOMSS audit 2017–2018. There were significant differences in the number of primary/ revisional surgeries with a p-value of 0.022 and no significant differences in the mortality rates with a p-value of 0.741.

Although bariatric and metabolic surgery is usually safe, with a mortality rate of 0.05%, which is less than any other type of major surgery (16), little is known about the effects of COVID-19 on patients who undergo BMS. Uccelli et al. reported a 5.5 % complication rate, and among the 218 patients who underwent bariatric/ metabolic surgery from 7 January 2020 to 2 March 2020. Three (1.5%) patients tested positive for COVID-19 (8). Aminian et al. reported three general surgeries and one gastric bypass fatalities due to acute respiratory distress syndrome (ARDS) caused by COVID-19 in February 2020 (6).

COVID-19 patients who underwent emergency surgery procedures are at high risk of suffering from complications. Doglletto et al. compared patients with COVID-19 with control patients without Covid-19 (odds ratio [OR] 9.5; 95% CI, 1.77-96.53). Their findings show that complications were significantly higher for patients with COVID-19 (OR, 4.98; 95% CI, 1.81-16.07), with pulmonary complications being the most common (OR, 35.62; 95% CI, 9.34-205.55) and thromboembolic morbidities being the second-most-common (24). A significant number of patients are asymptomatic and therefore preoperative screening is required (25). Furthermore, a Chinese study reported a 3.57% mortality rate for COVID-19 patients who underwent emergency surgeries (26).

COVID-surg collaborative reported 1128 patients who underwent surgery between 1 January 2020 and 31 March 2020, of whom 835 (74·0%) had emergency surgery and 280 (24·8%) had elective surgery. 294 (26·1%) patients tested positive to COVID-19 pre-operatively. The 30-day mortality rate was 23.8% (27). Obesity was not reported as an independent risk factor for mortality, but the study confirmed male sex, age 70 years or older, American Society of Anaesthesiologists (ASA) grades 3–5, surgery for malignant disease, emergency surgery and major surgery as risk factors. Furthermore, Lei et al.'s study shows that out of 34 COVID-19 patients who underwent different surgical procedures, seven (20.5%) died, while 32% developed ARDS and were admitted to the ITU (28).

In this study, no mortality was reported from the data and the morbidity rate was of 5.58%. The ASA grading of most BMS patients was ASAII–ASAIII. The mean preoperative ASA score was 3.3 (standard deviation of 1.1) (29). In comparison, a previous study showed a mortality rate of 0.3–1.4% for ASA II and 1.8–4.5% for ASA III (30).

Our data demonstrates relative safety of bariatric surgical procedures performed between 1 January 2020 and 31 March 2020. None of the patients included in this study used PPE until late March and there was no routine COVID-19 screening system in place during the period investigated.

The DSS and BOMSS suggest restarting bariatric/ metabolic surgery in a rationalised fashion, dividing the group of patients into categories depending on the urgency of their medical conditions and morbidities. Both confirm the known risks of delaying the procedures (11,31). The findings of this study might support the position of DSS and BOMSS.

Angrisani et al.'s (32) paper, which was endorsed by the International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO), suggested eligibility criteria which gave an ASA score of two for any bariatric and metabolic surgery patient to have surgery once elective bariatric and metabolic surgery procedures are

provided by hospitals again. This of course delays the provision of surgery for the high-risk patients, as highlighted by Rubino et al. in the DSS paper (11). The decision to operate on these high risk patients during COVID-19 crisis (when allowed) is to be taken with great caution and after extensive counselling with patients, his and her close family or next of kin and bariatric MDT. Delaying the surgery for the high-risk group may result in them suffering from complications similar to those of other special groups of patients, such as cancer patients. Therefore, bariatric and metabolic surgery patients should be given an appropriate priority by policymakers and health care providers to reduce the risks imposed on their health.

This paper confirmed the outcomes of the low-risk bariatric and metabolic surgery which is conducted by the highly skilled bariatric personnel and based on the solid infrastructure across the country. Patients with obesity face high COVID-19-related risks. The unclear picture and the duration of the crisis suggests that bariatric and metabolic surgery practice must continue based on the best evidence available. Therefore, given the provided data, this study confirmed relatively low complications and no mortality. The study showed that doing bariatric surgery during COVID-19 was not increasing the risks on this group of patients. The outcomes of this study is to be taken cautiously and we have to monitor and analyse the results of the operated patients during COVID-19 period closely to understand the risks. However ,the prudent conclusion would be with screening and PPE protocols would make it even safer.

GENERALISABILITY

The data of this study supports the resumption of bariatric and metabolic surgery after all necessary precautions are taken, including PPE, COVID-19 screening and self-isolation. This will add extra safety . Although the results could be reproducible at any centre which adopts the above method but these results should be considered as an exploratory and need further confirmation perhaps with a larger study sample.

LIMITATIONS

This study reports the BMS workload of 7 bariatric units in the UK. The enrolment rate is low and therefore representing a portion of BMS practice, taking into consideration the diversity of workload and the type of surgery offered at each BMS unit. The study is retrospective and include small number of patients.

Although the study was aiming to report the perioperative outcomes, the complication rate was lower than previously reported BOMSS data ,perhaps due to short follow up period. Some units provided perioperative complications (within a month of operation) while other units provided longer follow up.

Due to the structure of NHS, our patients could have been admitted in any other hospital with COVID-19 or other issues. We have not captured that in our data.

Therefore some complications might have been under-reported.

No ASA grading data were provided and we have referred to the published studies in that issue.

OAGB was offered as a BMS option by the enrolled seven units and this might have caused an over-representation of OAGB in this study. Some of the emergency procedures were performed due to complications of operations which were performed by different surgeons/hospitals and therefore the total number may not represent the total amount of cohort complications. There was no available data to compare GB with AGB or emergency surgery. The data covers from 1 January 2020 to 31 March 2020. This was the initial phase of COVID-19, just before the peak, from April to May 2020, of the reported cases in the UK.

CONCLUSIONS

This study confirms the high safety profile of bariatric and metabolic surgery during the early phase of COVID-19, when no strict PPE or COVID-19 screening was in place. This suggests that the resumption of bariatric and metabolic surgery, with the adaptation of PPE, COVID-19 screening, self-isolation before and after surgery and following local bariatric and metabolic surgery national body guidance, would replicate the high safety profile of the surgery during the early phase of COVID-19.

FOOTNOTES

Patients were not required to give informed consent to the study because the analysis used anonymous clinical data that were obtained after each patient agreed to treatment by written consent.

Conflict-of-interest statement: nothing to disclose.

Data sharing statement

No additional data are available.

Author contributions

A Hussain designed the study, wrote the draft and contributed to the data collection and analysis. The rest of authors had contributed to the data collections, reviewed the draft and critically appraised the paper, all authors approved the final version.

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