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Performing abdominal surgery during the COVID-19 epidemic in Wuhan, China: a single-centred, retrospective, observational study

Editor

Coronavirus disease 2019 (COVID-19) is now a global pandemic¹. To cope

with increasing medical demand, many operations have been postponed. We retrospectively analysed patients who received abdominal emergency surgery in Wuhan, China between 15 January and 15 March 2020, including eight patients with COVID-19 and 22 uninfected patients.

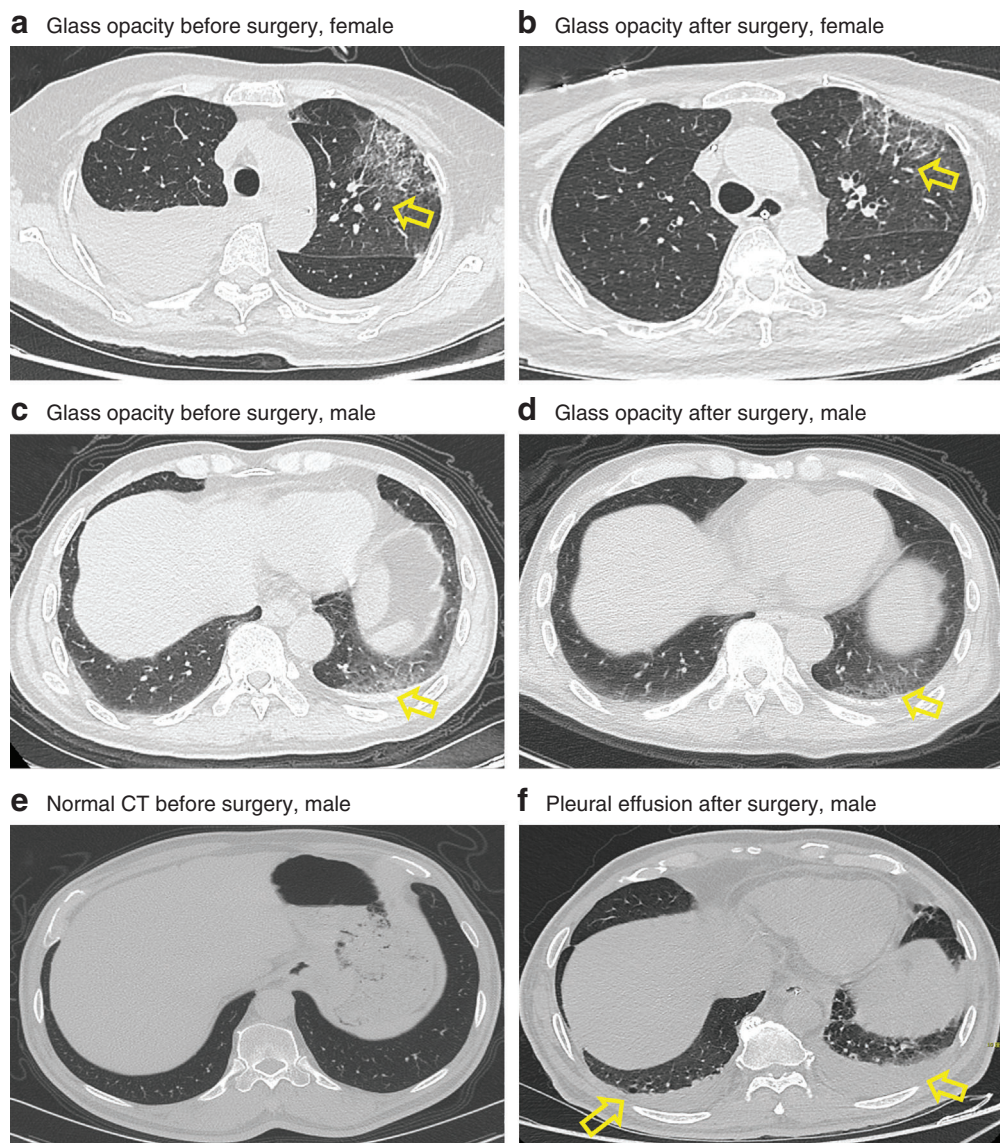
Patients' baseline characteristics are listed in Table 1. All COVID-19 patients had typical ground glass opacity changes on thorax CT². Five patients had low grade fever (below 38.5°C), two patients had a cough, and one patient was critically ill with an SpO_2 of 88% immediately before surgery. Duration of surgery was similar in infected and uninfected patients. As shown in Table 2,

before surgery, C-reactive protein (CRP) levels were higher in patients with COVID-19, but remained stable 3 days after surgery. In the uninfected group, there were raised CRP levels after surgery, which is a common post-operative variation. In addition, the percentage of lymphocytes was decreased in patients with COVID-19 but not in uninfected patients. We observed higher aspartate aminotransferase (AST) and alanine aminotransferase (ALT) levels in COVID-19 groups, but this could be caused by the primary disease. As shown in Fig. 1, after surgery, ground glass opacity, a typical CT image change in patients with COVID-19, remained stable or decreased slightly in all mild

Table 1 Baseline characteristics of patients

	Infected (n = 8)	Uninfected (n = 22)
Age (years)*	68 (67–69)	48 (41–64)
M : F	2 : 6	8 : 14
BMI (kg/m ²)†	24.04(1.95)	22.91(3.92)
Smoking		
Smoker	1	5
Non-smoker	7	17
Comorbidity		
Diabetes	0	4
Hypertension	2	5
Cardiovascular disease	0	1
Chronic obstructive pulmonary disease	0	0
Malignancy	2	5
Symptoms at admission		
Fever	5	2
Cough	2	0
Shortness of breath	1	0
Abdominal pain	7	3
Previous surgery		
Yes	4	13
No	4	8
Intervention		
Appendectomy	2	6
Gastrectomy	1	0
Enterocolectomy	2	8
Cholecystostomy	1	1
Pancreaticojejunostomy	1	1
Gastric perforation repair	1	6
Peritoneal contamination (yes : no)		
Yes	4	17
No	4	5
Duration of surgery (min)†	137.0(87.0)	164.0(92.6)

Values are *median (i.q.r.) or †mean(s.d.).

Fig. 1 Pre- and postoperative CT in COVID-19 patients

a 69-year-old woman before surgery, showing ground glass opacity (arrowhead). **b** Ground glass opacity was decreased slightly 7 days after surgery (arrowhead). **c** 68-year-old man before surgery, showing ground glass opacity (arrowhead). **d** Ground glass opacity remained stable 7 days after surgery (arrowhead). **e** Normal CT in 62-year-old man. **f** Pleural effusion 5 days after surgery (arrowhead).

cases. In both groups, we observed pleural effusion and atelectasis on CT, these postoperative changes were distinguished from the unique changes seen in viral pneumonia. All but the critically ill patient with COVID-19 recovered without respiratory support.

These data contribute information to help general surgeons in the area affected by the pandemic assess the safety of surgery. For mildly infected or asymptomatic patients, postoperative recovery seemed not to be affected. The study is limited by a lack of clin-

ical cases due to our previous overly conservative attitude. We recommend general surgeons be more positive when making surgical decisions. Hospital mortality might be higher not because of COVID-19, but because of the panic caused by COVID-19.



Table 2 Laboratory results of patients before and after surgery

	Infected (n = 8)		Uninfected (n = 22)	
	Before surgery	After surgery	Before surgery	After surgery
White blood cells ($\times 10^9/l$)	10.68(5.23)	12.54(3.16)	10.36(5.19)	10.09(3.15)
Lymphocytes (%)	11.85(6.82)	7.75(1.56)	14.35(11.75)	11.38(5.91)*
Neutrophils (%)	84.04(7.72)	86.93(3.03)	79.41(15.31)	81.92(7.73)
Basophils (%)	0.09(0.11)	0.09(0.11)	0.13(0.16)	0.11(0.10)
Eosnophil	0.54(0.96)	0.60(0.88)	0.88(1.48)	1.09(1.59)
Monocyte	3.48(1.58)	4.60(1.77)	5.29(3.06)	5.53(2.19)
Platelets ($\times 10^9/l$)	257.38(155.36)	168.88(97.13)	213.14(61.98)	185.32(74.52)
Total bilirubin ($\mu\text{mol/l}$)	23.22(13.47)	18.05(25.27)	20.53(13.52)	17.25(10.70)
C-reactive protein (mg/l)	100.06(93.98)	104.41(64.39)	55.12(119.12)†	163.74(94.50)‡
Alanine aminotransferase (units/l)	54.75(96.28)	42.38(59.67)	19.91(8.43)	22.64(9.33)
Aspartate aminotransferase (units/l)	53.38(84.85)	39.25(35.81)	21.27(10.00)	22.45(9.48)
Blood albumin (g/l)	35.75(5.01)	26.26(4.06)	40.13(6.34)	30.09(6.47)
Blood urea nitrogen (mmol/l)	6.92(2.44)	6.24(2.74)	7.29(5.97)	7.11(3.83)
Serum creatinine ($\mu\text{mol/l}$)	88.26(64.42)	56.58(16.97)	107.45(99.36)	71.30(36.03)
Clinical outcomes				
Cured/improved	7		19	
Died	1		3	

Values in parentheses are mean(s.d.). Laboratory tests were undertaken 3 days after surgery. * $P = 0.014$ versus infected group after surgery. † $P = 0.019$ versus infected group before surgery. ‡ $P = 0.035$ versus uninfected group before surgery (Mann-Whitney U test).

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