Evaluation of Clinical Signs for Diagnosis of COVID-19 in Patients Undergoing Elective Surgery

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Objective: this study tends to evaluate the clinical signs for diagnosis of covid-19 in patients undergoing elective surgery.

Methods: This is a case-control study. Patients undergoing elective surgery who tested positive for covid-19 infection based on a chest CT were considered as the case group and, if negative, were considered as the control group.All patients underwent a thorough examination before surgery and their clinical and demographic information was recorded in a designed checklist. Data were analyzed using chi-square test and SPSS software version 22.

Results: Clinical symptoms including fever, dry cough, sputum cough, dizziness, sore throat and anorexia are significantly higher in patients with Covid-19 than non-Covid-19 patients (P<0.05). There was a significant difference between laboratory findings including WBC, ALT, AST and CRP in patients with Covid-19 and non-Covid-19 patients (P<0.05).There was no significant difference between laboratory findings including Plt, PT, BUN, Cr and urinary protein in patients with Covid-19 and non-Covid-19 patients (P<0.05).

Conclusion: There is a difference between clinical signs and laboratory findings of patients with Covid-19 and non-Covid-19 patients and can be helpful in diagnosis and treatment of Covid-19 disease.

Keywords: Covid-19, clinical signs, laboratory findings

Introduction

SARS-CoV-2 has been identified as the pathogen responsible forcoronavirus-2019 (COVID-19) outbreak, which started in December 2019 in Wuhan, China.SARS-CoV-2, formerly known as the New Coronavirus-2019 (nCoV-2019), is a positive-sense, single-stranded RNA virus with a diameter of 60 to 140 nm.This is a new type of coronavirus, belonging to the beta coronavirus genes (1). A study shows that SARSCoV-2 has 86.9% homology to coronavirus similar to bat SARS (2).

Patients with COVID-19 can progress from asymptomatic or mild disease to hypoxic respiratory failure or multisystem failure and require intubation and intensive care management.Health care providers, particularlyanesthesiologists, are at the forefront of the epidemic, and to guide the

treatment management of patients with COVID-19, they must be aware of the best available evidence and remain safe while doing so (3).

Anesthesiologists are preparing to understand COVID-19 as it leads to global dissemination of an evidence-based preoperative infection control program that can significantly reduce the preoperative transmission of pathogenesis and development of associated infections.Preventing the transmission of pathogenesis is of particular importance, especially given the limited availability of personal protective equipment we currently face (4).

An accurate screening guide for patients with COVID-19 undergoing elective surgery needs to be developed to further help reducing transmission. In addition, long-term follow-up should be performed in patients with COVID-19 infection undergoing elective surgery (5).

Anesthesiologists and other preoperative care providers are at risk, especially when providing respiratory cares and endotracheal intubation in patients with COVID-19. World Federation of Societies of Anaesthesiologists (WFSA) tends to draw the attention of anesthesia teams to the importance of appropriate precautions when providing respiratory and intubation care for these patients (6).

In a review of studies performed on coronavirus, no study was performed on examination of clinical signs to diagnose covid-19 in patients undergoing elective surgery. On the other hand, developing a preoperative program for management of patients with covid-19 has become a challenge for the anesthesiologist.Considering the outbreak of SARS-CoV-2 epidemic leading to COVID-19 as a highly contagious and potentially deadly disease in almost all countries of the world which has so far infected more than 2.5 million people worldwide,particularly considering that this virus is a new virus and many of its dimensions and behaviors are still unknown, the need for extensive research in all fields of basic and clinical sciences in this field is quite tangible. Therefore, this study tends to evaluate the clinical signs for diagnosis of covid-19 in patients undergoing elective surgery.

Materials and Methods

This study was a case-control study that was performed on patients who referred to operating room for elective surgery and required general anesthesia.After obtaining approval from the ethics committee and obtaining written consent from patients, 60 patients were included in this study based on inclusion and exclusion criteria.Inclusion criteria: ASA class I, II; age between 20-80 years; patient consent; patients whose surgery time is less than 120 minutes;absence of neuromuscular diseases; no history of difficult intubation; no possibility of difficult intubation in clinical examination (Mallampati 4; stiff neck, opening of mouth less than 1 mm, thiromental<2 mm); and no complications during surgery (bleeding and damage to nearby organs, etc.).Exclusion criteria: age younger than 20 years and older than 80 years, disease in both nasal passages, coagulation problems or high possibility of aspiration. Patients were examined, provided they had inclusion criteria and no exclusion criteria. Patients who tested positive for covid-19 infection based on chest CT scan were considered as case group and patients who tested negative for covid-19 infection based on chest CT scan were considered as control group.

All patients underwent a thorough examination before surgery and their clinical and demographic information was recorded in a designed checklist.

This information included age, gender, BMI, underlying diseases including hypertension, diabetes, kidney disease, etc., symptoms of covid-19 disease including fever, dry cough, sputum cough, dizziness, sore throat, anorexia, etc. and results of laboratory parameters including WBC, Plt, PT, ALT, AST, BUN, Cr, CRP, urinary protein, etc.Routine care was provided to patients in both groups. Patients in the two groups were matched in terms of age and gender.

The results were expressed as mean and standard deviation (Mean $\pm$ SD) for quantitative variables and as percentage for qualitative variables.In the analytical stage, independent t-test or Mann-Whitney test was used to compare quantitative variables. Chi-square test was used to compare qualitative variables (P-value<0.05). SPSS software version 25 was used for statistical analysis of data (P-value<0.05).

Results

In this study, 60 patients who referred to the operating room of the hospital for elective surgery in 2020 and met the inclusion criteria were recruited. Thirty patients were assigned to the group and 30 patients were assigned to the control group.

As shown in Table 1, there was no significant difference between age, gender, BMI and underlying diseases of patients in the two groups (P<0.05).

Table 1: Comparison of age, gender, BMI and underlying diseases of patients in two groups

Variable	Group		P-value
	Case	Control	
Age (year) Mean±SD	14.35±61.89	14.12±56.56	0.076
Gender Female Male	13 (43.3%) 17 (56.7%)	11 (36.7%) 19 (63.3%)	0.792
BMI (kg/m^2) Mean±SD	2.02±25.96	2.26±25.6	0.499
Underlying disease Yes No	28 (93.3%) 2 (6.7%)	25 (83.3%) 5 (16.7%)	0.424

As Table 2 shows, clinical signs including fever, dry cough, sputum cough, dizziness, sore throat, and anorexia are significantly higher in patients with Covid-19 than in non-Covid-19 patients (P<0.05).

Table 2: comparison of clinical signs of patients in two groups

Clinical signs of Covid-19	Group		P-value
	Case	Control	
Fever			
No	14 (46.7%)	24 (80%)	0.015
Yes	16 (53.3%)	6 (20%)	
Dry cough			
No	15 (50%)	24 (80%)	0.029
Yes	15 (50%)	6 (20%)	
Sputum cough			
No	13 (43.3%)	24 (80%)	0.007
Yes	17 (56.7%)	6 (20%)	
Dizziness			
No	12 (40%)	23 (76.7%)	0.008
Yes	18 (60%)	7 (23.3%)	
Sore throat			
No	12 (40%)	25 (83.3%)	0.001
Yes	18 (60%)	5 (16.7%)	
Anorexia			
No	11 (36.7%)	25 (83.3%)	<0.001
Yes	19 (63.3%)	5 (16.7%)	

There was a significant difference between laboratory findings including WBC, ALT, AST and CRP in patients with Covid-19 and non-Covid-19 patients ($P<0.05$). As shown in Table 3, there was no significant difference between laboratory findings including Plt, PT, BUN, Cr and urinary protein in patients with Covid-19 and non-Covid-19 patients ($P<0.05$).

Table 3: comparison of laboratory findings of patients in two groups

Variable	Group		P-value
	Case Mean±SD	Control Mean±SD	
WBC (cell/mm^3)	1037±4120	1264±6525	<0.001
Plt(×109/L)	43.26±210.2	45.41±199.5	0.402
PT (s)	1.23±13.1	1.32±13.4	0.216
ALT (IU/L)	8.25±30.08	7.41±23.15	<0.05
AST (IU/L)	7.41±31.2	6.55±24.45	<0.05
CRP (mg/L)	7.37±35.08	3.26±6.65	<0.001
BUN	5.24±73.5	4.32±71.22	0.321
Creatinine	1.37±3.08	1.26±2.65	0.127
24-hour urinary protein	558.56±571.54	805.53±703.56	0.63

Discussion

Based on the most important results of the present study, there was a significant difference between clinical signs and laboratory findings of patients with Covid-19 and non-Covid-19 patients.

According to literature review, few studies have been performed to compare the clinical signs and laboratory findings of patients with Covid-19 and non-Covid-19 patients; thus, comparing the present study with other studies is limited.Zhao et al. (2020), consistent with the present study, found that contamination in the operating rooms of 4 hospitals was reduced with implementation of new measures and steps; 10 patients (27%) had chronic medical conditions, including 4 cases (11%) of diabetes, 8 cases (22%) of hypertension and 8 cases (22%) of gastrointestinal diseases; 25 patients (68%) had lymphopenia.COVID-19 Special Guidelines for Emergency Procedures for Patients Diagnosed or Suspected as a Valid or Suspected nCoV-2019Patientmayeffectively prevent cross-infection in the operating room.Most diagnosed and suspected Covid-19 patients have fever and dry cough (9).Mardani et al. (2021), consistent with the present study, found that there is a significant difference between laboratory findings of patients with Covid-19 and patients without Covid-19 and differences in laboratory findings such as AST, CRP and ALT can be helpful in diagnosing patients with COVID-19 (10).

Cai et al. (2021), consistent with the present study, found that there is a significant difference between laboratory findings of patients with severe symptoms of Covid-19 and patients without severe symptoms (11).

One of the strengths of the present study is that it is a case-control study. However, our study had some limitations.First, few similar studies have been performed and it was difficult to compare the present study with other studies. Therefore, it is suggested that similar studies be designed in the future. Second, the sample size in the present study was small. Significance of the two groups can also be due to small sample size; thus, it is suggested that the sample size be larger in future studies.

Based on results of the present study and comparison with results of other studies, it seems that there is a difference between clinical signs and laboratory findings of patients with Covid-19 and non-Covid-19 patients.

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