



# Prone positioning is helpful in management of wake spontaneously breathing COVID 19 patients

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## SUMMARY

Iraq is one of the affected countries with COVID19 epidemic as many world countries. This study aimed to assess the application of prone positioning in management of awake spontaneously breathing patients. A Clinical interventional study done on 52 COVID 19 patient in Tikrit city, from 1<sup>st</sup> June -30<sup>th</sup> August 2020. awakened spontaneously breathing patients were enrolled. Lung involvement was assessed by CT. The SPO2% was reported for the patient at resting sitting position and in prone position for 4-5 minutes. The patient was instructed to apply the prone positioning multiple times during the 24 hours for the whole period of the illness. The age of the patient were  $48.6 \pm 13.6$ , most of the patient aged 31-40 years 14(26.9%). Most of the affected patients were male 31(59.6%). The mean lung involvement was  $18.5 \pm 15.7$ . The duration of illness was  $15.7 \pm 4.9$  day. The SPO2 % in in prone positioning was higher than in sitting position ( $94.12 \pm 5.14$ ), ( $87.3 \pm 6.93$ ) respectively, and still higher in among patient with same lung involvement. There were a significant negative correlation between SPO2 and age, damaged surface area of the lung, and illness duration. This effect was in prone positioning lower than in sitting. Prone positioning is helpful in increasing the SPO2 level and relieving hypoxia among a wake patients with COVID19. Therefore the results of this study is valuable because the use of the prone positioning will help in decreasing the need for ventilators and will decrease the mortality rate due to hypoxia among COVID 19 patients.

**Key Words :** COVID19, SPO2, hypoxia, prone positioning

COVID19 mortality rate was 4.56%.<sup>(1)</sup> Death mostly related to sever hypoxia as a result of lung tissue destruction.<sup>(2,3)</sup>

## INTRODUCTION

The global pandemic newly emerging COVID19, is highly infectious, increasing in rate and the mortality rate depend on the disease severity and health system infrastructure.<sup>(1)</sup>

In Iraq the accumulated active cases was 9080 as reported by WHO. In 11th Oct. 2020.<sup>(4)</sup> Total confirmed cases in one day was 2,206 new cases and 62 new deaths.<sup>(5)</sup>

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Prone positioning was reported to be beneficial in patient with mechanical ventilation, but its use among wakened patient was reported previously in the 1970 and in 1999 among patient with respiratory failure and infants with spontaneous breathing pneumonic infant. <sup>(6-8)</sup>

Recently a report of Valter C. et al of four cases with COVID 19 that were in hypoxemic respiratory failure and responded very well to awake prone positioning.<sup>(9)</sup>

From the previously reported cases and the normal physiology of breathing and gas exchange during prone positioning gives hope for using this procedure in the management of spontaneously breathing COVID 19 patients.

Health system in Iraq was badly eroded during wars and widespread violence which in turn affect the quality and quantity of health services provided, including respiratory health services in Iraqi Hospitals, indicating, urgent need for testing the efficiency of prone positioning in relieving hypoxia in a wake patient. This study aimed to assess the application of prone positioning in management of awake spontaneously breathing COVID19 patients.

### **METHODS**

Clinical interventional study was done on 52 patient proved to have COVID 19, in Tikrit city, from 1st of June to the end of August. All enrolled patients were awake and spontaneously breathing not on mechanical ventilation. Information regarding age, gender other diseases, signs and symptoms, and signs of dyspnea was documented. Lung involvement percentage was assessed by CT. The SPO2% was reported for the patient at resting sitting position then it was reexamined after positioning the patient in prone position for 4-5 minutes and the SPO2 tested again in prone position.

The patient was instructed to apply the prone positioning multiple times during the 24 hours for the whole period of the illness. Then the follow up of the patient was done through clinical examination, SPO2 % measurement. Patient agreement was taken before enrollment in the study, after full explanation about the study and the procedure used.

### **RESULTS**

The age of the patient were  $48.6 \pm 13.6$ , most of the patient aged 31-40 years 14(26.9%), followed by those > 60 years 13(25%), 41-50 years 12(23.1%), and 51-60 years 10(19.2%). The sample distribution according to the gender show that most of the affected patients were male 31(59.6%), and the female were 21(40.4%). The lung involvement show that the mean of lung involvement was  $18.5 \pm 15.7$  percent, with 3 patient 5.8% with no lung involvement. The duration of illness until remission was  $15.7 \pm 4.9$  day. As shown in table 1.

The SPO2 % in sitting position was lower than in prone positioning ( $87.3 \pm 6.93$ ), ( $94.12 \pm 5.14$ ) respectively.

This difference was statistically significant  $< 0.001$  (paired t-test t value= -17.4), (table 2).

Age was significantly affect the SPO2 the effect was negatively. The damage by surface area of the lung. The duration of illness was significantly negatively affect the SPO2% level. These effect was true in both sitting and prone position.as shown in (table 3)

The relation between SPO2% and lung involvement show that for the same percent of lung involvement prone positioning had higher SPO2% than in sitting position this relation is true with increasing lung involvement.

Table 1. The general characteristics of the patient

Variable	Frequency	Percent
<b>Age</b>	48.6±13.6	
<b>&lt;30</b>	3	5.8
<b>31-40</b>	14	26.9
<b>41-50</b>	12	23.1
<b>51-60</b>	10	19.2
<b>&gt;60</b>	13	25
<b>gender</b>		
<b>Male</b>	31	59.6
<b>Female</b>	21	40.4
<b>Chest CT results</b>	18.5±15.7	
<b>duration of illness</b>	15.7±4.9	

Data are the mean±SD. Age , Chest CT results , duration of Illness

Table 2. The mean SPO2% in sitting and post prone positioning

	Mean	Std. Deviation	Difference in mean	Std. Deviation	P value (paired t-test)
<b>SPO2% in sitting position</b>	87.3	6.93	-6.9	2.8	< 0.001(-17.4)
<b>SPO2% in prone position</b>	94.12	5.14			

Table 3. The correlation between SPO2 percent at sitting and prone positioning with different variables

Variables	SPO2 sitting position	SPO2 prone position
<b>Age</b>	r	r
<b>Chest CT results</b>	-0.422**	-0.421**
<b>duration of illness</b>	-0.785**	-0.775**
	-0.51**	-0.44**

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

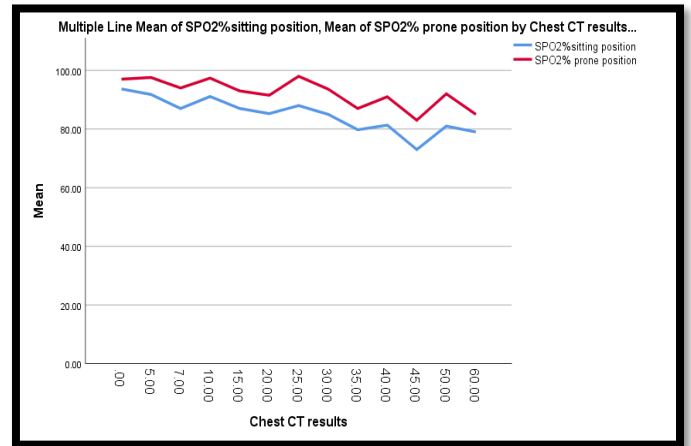


Figure 1. The mean SPO2% at sitting and prone positioning according to chest CT percent of lung involvement

### Discussion

Most of the affected patients in this study, were aged 31-40 years 14 (26.9%), this goes with newly reported data from different regions of the world that COVID19 was newly had increasing rates among young aged people<sup>(10)</sup>. This may be resulted from multiple factors as followings; increased surveillance, increased disease awareness, and the younger age people were more socialized and spend a lot of time outside the house and the least committed to preventive measures, eat, work, play, in the public places. In the East communities, and cultures, the age group (31-40) is usually they are heads of families and are responsible for the family needs provision, making those with younger age and older age healthy. In the current study, the most of the affected patients were male 31(59.6%), versus 21(40.4%) were female. This is not agrees with Tae Heum Jeong et al <sup>(11)</sup> who found that female (57%) affected more than male (43%). In the current study, the duration of illness until remission was (15.7±4.9 day). This was longer than what reported by Lechien JR that mean duration was (11.5 ± 5.7 days)<sup>(12)</sup>, and in China (10.63±1.93 days) for mild to moderate patients.<sup>(13)</sup> While it was lower than what reported in other two chines studies 20-21days.<sup>(14,15)</sup> Previous studies documented response of patient with hypoxemic acute

respiratory failure<sup>(16)</sup> and among moderate to severe ARDS patients<sup>(17)</sup> for prone positioning in improving hypoxemia. Babuyeh T et al found it effective in the preterm infants<sup>(18)</sup>.

The SPO2 % in sitting position was lower than in prone positioning (87.3±6.93), (94.12±5.14) respectively, this goes with Elharrar et al [19] found that mean Pao2 increased from (73.6 ± 15.9) to (94.9± 28.3) after prone positioning, with a response rate of 25% for the prone positioning, 20.8% needed intubation, most of them didn't tolerate prone positioning for 1hr or more. Caputo ND et al<sup>(20)</sup> in a study on 50 patients found that SPO2 raised from 84% to 94% after prone positioning for 5 minutes. Thompson et al.<sup>(21)</sup> reported improvement of Pao2 1-34%, patients with an Spo2 of 95% or greater after 1 hour of the prone position was associated with a lower rate of intubation. Around (37%) of the patients required intubation, most of them their SPO2 remained less than 95%. Ng et al<sup>(22)</sup> tested Patients after prone positioning for 1 h each session, five sessions per day, each spaced 3 h apart during waking hours. Arms were positioned at the side or abducted to less than 90 degrees at the shoulder and flexed at the elbow. Using this procedure 1 patient out of the 10 enrolled patients required intubation. The same result found by Sartini et al.<sup>(23)</sup> The differences of response rate among the studies mean that the response may be depend on the severity of the disease, and may be other related factors that need more studies.

The patient those elected in the current study all of them were Muslims, and the culture of this community make all of them were praying, the Muslims pray five times a day. The pray contain 34 prone positioning for at least 1 minute, therefore we noticed that most of our patients were tolerated the dyspnea despite of the lung involvement. This

can be explained by the fact that, in addition to the spiritual advantages of (Salah) prayer it has been widely known that the process of praying promotes a lot of psychological & physical advantages.

Every position includes the movement of various human body parts in ways that promote wellbeing and health.<sup>(24)</sup>

Based on Islamic instructions is an obligation to take care of our health. Keeping our minds and bodies and minds are our responsibilities.<sup>(25,26)</sup>

The goal of physiotherapy is to improve patient's oxygen saturation and to promote expectoration, and both are present in the prayer movement.<sup>(27)</sup>

Movements included in Salah that promote physiotherapy especially prostration (Sajdah) are the followings; flexion of the lower back, working of the postural neck muscles in lowering down, then lifting from the ground. Weight through the arms requires good control of the shoulder blades and uses the movements of the rotator cuff muscles that stabilize the shoulder. It is worthy to mention the benefit of removal of chest secretions by gravity and in addition to active expectoration.<sup>(24)</sup> "Prophet Muhammad (Peace Be upon Him) has said"...the nearest a servant comes to his lord is when he is in prostration (Sajdah)". (Al-Bukhari)".<sup>(24-27)</sup>

### Conclusions

Prone positioning is helpful in increasing the SPO2 level among a wake patients with COVID19. Therefore the results of this study is valuable because the use of the prone positioning will help in decreasing the need for ventilators and will decrease the mortality rate due to hypoxia among COVID 19 patients.

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