

## Current Scenario in COVID- 19

Sweety Dutta, <sup>1</sup> Priyanka <sup>1</sup>, Pranav Bansal <sup>2</sup>

1. Resident, 2. Professor & Head;

Department of Anesthesiology & Critical Care, BPS Government Medical College, Khanpur Kalan, Sonapat, Haryana, India.

*[Please select the one best option]*

**Q.1: Which of the following delivers the purest form of Oxygen?**

- a) Oxygen concentrator
- b) Liquid oxygen
- c) HFNC
- d) Oxygen Cylinder

**Q.2: At room temperature 20°C and atmospheric pressure 760 mmHg, 1 L of liquid oxygen expands to approximately how many litres of gaseous oxygen?**

- a) 450 L
- b) 760 L
- c) 860 L
- d) 1000 L

**Q. 3: Which of the following technologies is utilized in the processing of oxygen concentrator?**

- a) Pressure swing absorption (PSA) technology
- b) Nitrogen separation membrane technology
- c) Both a and b
- d) None of the above

**Q.4: Which of the following is the critical temperature for storage of liquid Oxygen?**

- a) -60°C
- b) -119°C
- c) -218°C
- d) +60°C

**Q.5: At 20° C, E- type of oxygen cylinder with pressure of 1000 psig (half filled),**

**when opened with a flow rate of 3 L/min will get exhausted in approximately how much time?**

- a) 30 min
- b) 50 min
- c) 110 min
- d) 180 min

**Q.6: Which of the following is the best statement to justify the need of two zeolite sieves placed in an oxygen concentrator?**

- a) The period of oxygen outflow from one, coincides with the discharge of nitrogen from the other, to deliver a continuous supply of oxygen enriched gas
- b) Aluminium trisilicate removes nitrogen very efficiently
- c) The presence of lithium in two cylinder helps in delivery of oxygen enriched air
- d) Removal of nitrogen increases the oxygen concentration by 50% only if one cylinder is present

**Q. 7: Which of the following covid-19 vaccines is based on viral vector mechanism and given as single shot?**

- a) AstraZeneca
- b) Sputnik V
- c) Moderna
- d) Janssen

**Q.8: Mark the correct statement regarding different scoring system in a patient with Covid-19.**

- a) CT- severity score > 15 is moderate disease
- b) CORAD-6 denotes Typical Covid-19
- c) CT value of RT-PCR > 35 signifies low viral load
- d) CT value of RT-PCR > 35 signifies high viral load

**Q. 9: Which of the following statement is false regarding amphotericin B?**

- a) It acts by binding to sterols in fungal cell membrane leading to alteration in cell permeability and cell death
- b) Plasma half-life is 24 h
- c) Risk of hepatotoxicity

- d) Used cautiously while co-administering with other drugs that causes hypokalemia

**Q. 10: Which of the following statements is false with respect to Mucormycosis?**

- a) Most prevalent site is lung, followed by paranasal sinus, brain, skin, GIT
- b) Most common differential diagnosis is aspergillosis
- c) Pulmonary mucormycosis typically develops in patients with profound neutropenia and graft-versus-host disease, whereas diabetic patients typically present with rhino-orbital disease.
- d) Biopsy and culture are not a strong diagnostic aid as compared to antigen test

**ANSWERS**

**1: (b)** Liquid oxygen delivers purest form of oxygen. The medical liquid oxygen (minimum 99.5% purity) must first be vaporised to a compressed gas then warmed at ambient temperature inside the equipment before the patient can receive the oxygen.

**2: (c)** Liquid oxygen has an expansion ratio of 1:860

1 gram mole of oxygen = 32

As per Avogadro's hypothesis 1 gram mole of any gas in liquid form will yield 22.4 litres of gas.

**3: (c)** These devices use the pressure swing adsorption method to concentrate oxygen in places that avoid the use of liquid oxygen due to its high combustibility. PSA works by quickly cycling pressure and simultaneously alternately venting the opposite ends of the column. This leads to reduction of size of adsorbed bed and discarding of feed gas. In membranes act as a permeable barrier which different compounds move across at different rates or do not cross at all.

**4: (b)** The critical temperature of a substance is the temperature at and above which vapor of the substance cannot be liquefied, no matter how much pressure is applied.

**5: (c)** A pressure of 1000 psi indicates an E-cylinder that is approximately half full and represents 330 L of oxygen at atmospheric pressure and a temperature of 20°C. If the oxygen is exhausted at a rate of 3 L/min, a cylinder that is half full will be empty in 110 mins.

**6: (a)** Two sieve beds are located in the concentrator. After air is first compressed in the concentrator, it is forced into the first sieve bed. Oxygen is sent into the product tank. The first sieve bed then gets filled up with nitrogen. Next, the gas flow is switched, and the compressed air is moved to the second sieve bed. The first sieve bed's compressor is sent to the outside room, and the air from the product tank goes back into the first sieve bed.

The drop in pressure from the first sieve bed and the weakening of oxygen makes the Zeolite release nitrogen. The *oxygen* and *nitrogen* come back together and are released in the room as regular air. The air is then compressed and sent to the second sieve where *oxygen* is moved through it to the *product tank*. The whole cycle starts over again with the first sieve after a few seconds.

The period of oxygen outflow from one, coincides with the discharge of nitrogen from the other, to deliver a continuous supply of oxygen enriched gas to the patient.

**7: (d)** It is a recombinant, replication–incompetent Ad26 vector, encoding a stabilized variant of the SARS–CoV–2 Spike (S) protein as active ingredient. Covid–19 vaccine AstraZeneca and sputnik–V also are viral vector type of vaccines but given in 2 doses. Moderna is a mRNA type of vaccine.

**8: (c)**

<p><b>RT PCR report CT (Cycle Threshold):</b> In value, RT PCR report Ct (cycle threshold) is evaluated to understand the viral load and infectiousness. Lower the value higher is the viral load</p>	<b>Score</b>	<b>Viral load</b>
	<b>17-24</b>	<b>High viral load</b>
	<b>24-35</b>	<b>Moderate viral load</b>
	<b>&gt;35</b>	<b>Mild viral load</b>

<p><b>HRCT Chest</b></p>																					
<p><b>CT Severity Score</b></p>	<p><b>CO-RADS score:</b> Level of suspicion for COVID-19</p>																				
<table border="1"> <tr> <th>Score</th> <th>CT severity</th> </tr> <tr> <td>&lt; 8</td> <td>Mild</td> </tr> <tr> <td>9-15</td> <td>Moderate</td> </tr> <tr> <td>&gt; 15</td> <td>Severe</td> </tr> </table>	Score	CT severity	< 8	Mild	9-15	Moderate	> 15	Severe	<table border="1"> <tr> <th>CO-RADS 1</th> <th>No</th> </tr> <tr> <th>CO-RADS 2</th> <th>Low</th> </tr> <tr> <th>CO-RADS 3</th> <th>Intermediate</th> </tr> <tr> <th>CO-RADS 4</th> <th>High</th> </tr> <tr> <th>CO-RADS 5</th> <th>Very high</th> </tr> <tr> <th>CO-RADS 6</th> <th>Very high with PCR+</th> </tr> </table>	CO-RADS 1	No	CO-RADS 2	Low	CO-RADS 3	Intermediate	CO-RADS 4	High	CO-RADS 5	Very high	CO-RADS 6	Very high with PCR+
Score	CT severity																				
< 8	Mild																				
9-15	Moderate																				
> 15	Severe																				
CO-RADS 1	No																				
CO-RADS 2	Low																				
CO-RADS 3	Intermediate																				
CO-RADS 4	High																				
CO-RADS 5	Very high																				
CO-RADS 6	Very high with PCR+																				

<b>CRP</b> (mg/dl)	Severity of inflammation
0-6	Normal
<26	Mild
26-100	Moderate
>100	Severe

<b>D dimer</b> (Micro gram/ml)	Severity of inflammation
<0.5	Normal
<1	Mild
>1	Moderate-severe

IF D dimer measured in ng/ml then multiply above reading by 1000

<b>IL6</b> (pg/ml)	Severity of inflammation
0-7	Normal
<15	Mild
15-100	Moderate
100-500	Severe
>500	Critical

<p><b>Neutrophil to Lymphocyte ration (NLR)</b> &lt;3.5 –Mild &gt;3.5- Moderate-severe</p>
--

	<b>Normal range</b>
<b>Ferritin</b>	13-150 ng/ml
<b>LDH</b>	0-250 U/L
<b>ESR</b>	0-22 mm/ hour

<p><b>Antibody Tests</b></p> <p>1) <b>Specific:</b> SARS COV2 Anti Spike Protein Antibody Test- <u>15</u> required for protection</p> <p>2) <b>General:</b> SARS COV2 IgG Antibody Test</p>
---

**9: (c)** Amphotericin B acts by binding to ergosterol in the cell membrane of most fungi. After binding with ergosterol, it causes the formation of ion channels leading to loss of protons and monovalent cations, which results in depolarization and concentration-dependent cell killing.

Amphotericin B also produces oxidative damage to the cells with the formation of free radicals and increasing membrane permeability.

The half-life of amphotericin B is from 24 h to 15 days.

The most common side effects of amphotericin B include loss of potassium, loss of magnesium, anaphylaxis, fever, nephrotoxicity (doses greater than 1 mg/kg), Bone marrow depression.

**10: (d)** Mucormycosis are life-threatening fungal infections mostly occurring in hematology, solid organ transplant, or diabetic patients; also immunocompetent patients after trauma or burns.

Most common clinical presentations are rhino-orbito-cerebral and pulmonary.

The most common radiological pattern of lung mucormycosis on initial computed tomography (CT) scan is a halo sign and then nodule or a mass.

Unlike invasive aspergillosis, the detection of circulating antigen such as galactomannan and  $\beta$ -D-1,3-glucan provides no help for mucormycosis diagnosis, samples from the infection site are highly required to diagnose mucormycosis based on the microscopic detection of typical hyphae or on a positive culture.