

COVID-19 Early experiences from a physiotherapy perspective

It is important to note this is by no way a definitive treatment guide for patients presenting with COVID-19, rather a summary of my own and my teams experience over the past 10 days. Like most of you, we all felt very much like we were in a period of calm before a storm, or as one of our consultants has described it, the part of a tsunami where the water first goes out to sea. Even when we emptied the cardiothoracic section of our ICU, there was still maybe a sense that this wasn't really happening or we were over reacting a little, but better to be prepared just in case. Over the past week and a half we have started to see a gradual stream of initially new admissions with suspected COVID-19 and now an increasing number of confirmed cases.

So let's start with what we all probably know and were expecting. COVID-19 is an inflammatory condition which, in severe cases, presents as a severe ARDS picture. The reports from other countries have stated that patients with COVID-19 do not have high secretion loads which would require intensive physiotherapy / airway clearance in the very early stages. In these instances our initial approach was to keep staff contact to a minimum to help reduce the risk of transmission and as such daily input was based on an assessment of risk vs benefit with the intensivist. This felt a little contrary to my whole career, which I have spent championing our essential role in critical care and the importance of being involved in the care of even the most acute patient presentations. However, given the severe ARDS presentations seen both clinically and on CT imaging this seemed an appropriate approach.

However, as the last week has progressed our experience has actually been quite different. As has been reported in other countries, the severity of ARDS is high and as such patients have often been prone and paralysed. On suctioning there have been only minimal secretions initially in the prone position, but on return to supine they were quite often abundant, thick and tenacious. This increase in secretion viscosity combined with the absence of a cough effort is potentially then adding further difficulties to ongoing mechanical ventilation management. As such, we are becoming increasingly

involved in the daily assessment and treatment of these patients, the specific considerations of which are described below.

Assessment

Auscultation is not possible when wearing a hood, and even when wearing a mask there is a risk of contamination due to close and repeated contact with the face. As a physio this feels very restrictive, and you suddenly realise how much you use this as a skill throughout your assessment and treatment to guide your management. We are not auscultating routinely if at all, and instead are using other mechanisms of assessment such as palpation and ventilator waveform analysis. I have found when palpating the chest, the addition of an overpressure through expiration has been useful, essentially using a form of passive autogenic drainage to feel for secretions at lower lung volumes. With regards to waveforms, we are specifically focussing on flows, with thicker secretions visible as either obstructed expiratory flows or saw tooth patterns.

Treatment

In view of COVID-19 being an inflammatory condition, lung protective ventilation is an essential part of early management. The rationale for physiotherapy treatment needs to be evaluated in the context of clinical stability and these lung protective measures. At times this may mean that whilst secretions are present, patient instability is such that the benefit of secretion clearance is outweighed by the risk of further deterioration due to increased V/Q mismatch or cardiovascular instability. It is clear already that for the foreseeable future our clinical reasoning will be challenged significantly by this daily debate and team communication and collaborative decision making will be vital.

Treatment itself would probably be viewed as following a similar pattern to normal respiratory physiotherapy in ICU, involving a combination of positioning, manual techniques and suction. After the first few days saline has been used for almost all cases due to the increasing viscosity of secretions and we are now exploring the potential for early prescription of mucolytics to help with this. We have been using HME's for humidification as is standard practice

in our unit, combined with concerns regarding humidified circuits and potential transmission of the virus.

The major challenges we have faced to secretion clearance have been around the requirement for paralysis, with ventilator asynchrony extremely common amongst cases we have seen so far. In these cases we have been using manually assisted cough / expiratory compressions in combination with deep suction to access secretions successfully. As a two person technique this is becoming increasingly labour intensive process and staffing models will need to consider this extra requirement moving forwards. We have also used this approach for a patient in the prone position with large volumes of thick secretions. In this instance we have had some success with some instilling saline whilst the bed is tilted, then performing manual techniques and assisted cough with the bed flat or a slightly head down position. So far this has appeared to work well when completed immediately prior to turning patients back to a supine position.

One of the obvious potential complications for this combined cough and suction technique is however the risk of de-recruitment. The message is strong and clear that disconnection from the ventilator and manual hyperinflation (bagging) should be avoided due to the risk of transmission, potential lung damage and de-recruitment. In an emergency situation such as acute desaturation or sputum plugging MHI (manual hyper-inflation) is possible, but the ET tube needs to be clamped prior to disconnection and transfer to the bag. Whilst VHI (ventilator hyper-inflation) avoids the need for disconnection, there is still a significant risk of barotrauma and lung damage and as such should be avoided where possible and not used routinely. We have used VHI at times for those patients requiring lower peak inspiratory pressures; although in reality this appears to be rare with the patients we have seen so far.

Other things that have struck us this week and recommendations.

- It gets very hot when wearing full PPE for extended periods. The recommendation on our unit is to make sure you are well hydrated and take breaks as needed.

- The donning and doffing of PPE is time consuming and has been a source of some confusion. Make sure you have a clear plan, display instructions and preferably have identified individuals at all times to help with this process.

Future challenges and considerations

- As numbers continue to rise there is a need for training and up-skilling of staff. We have started doing this now as once numbers start to rise significantly there will be very little capacity for this training
- Staff wellbeing is going to be a key consideration moving forwards, particularly the need to make sure people feel supported, valued and a involved in decision making. I have set up regular meetings with my team to keep them informed as things develop, with circumstances changing on a daily or even hourly basis at times. This also provides an ideal forum for staff to raise any fears or concerns they may have.
- There is likely to be a significant rehabilitation burden as we progress through this period. Longer periods of mechanical ventilation, coupled with deep sedation and / or paralysis will undoubtedly result in significant rates of ICU acquired weakness. The current recommendation is also to not perform tracheostomies before day 10. This will be at a time when services are already extremely stretched and fragmented making the delivery of an early and structured rehabilitation service more challenging than ever. Separate work is ongoing in this area with hopefully more to follow soon.

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