LETTER TO THE EDITOR

Capillary blood gases in acute exacerbations of COPD by Ross Murphy et al.

It is with great interest that I read the paper by Ross Murphy et al.\(^1\) With reference to the poor correlation between arterial \(P_O_2\) and earlobe capillary \(P_O_2\), I would like to suggest a few reasons for these discrepancies. There have been several previous publications\(^2,3\) and an important editorial,\(^4\) where good correlation was found with arterial and capillary \(P_O_2\)'s. However, these studies all used blood gases where the \(P_aO_2\)'s were less than about 13.0 kPa.

In Professor Hughes editorial,\(^4\) he clearly stated that capillary samples with \(P_O_2\)'s greater than 11.0 kPa should be treated with caution. I note from Dr. Murphy's study that there were a significant number of data points plotted that had \(P_O_2\)'s in excess of 11.0 kPa. A few blood samples had \(P_aO_2\)'s of approximately 30.0 kPa. I believe that this was the likely reason for lack of comparability with a significant number of samples. It is evident from the graphs plotted that the poor correlation could be easily seen when those samples with high \(P_aO_2\)'s were included. However, there was good correlation when blood gases with low \(P_aO_2\)'s were used (\(P_aO_2\)'s < 12.0 kPa). Generally speaking, if capillary blood sampling is used in conjunction with high \(P_O_2\) blood samples, there is a tendency for the 'real' result to be underestimated, probably due to an inevitable fall in the capillary blood gas \(P_O_2\). This is associated with the initial \(P_O_2\) in the blood gas, having a higher oxygen partial pressure than that in the atmosphere.

Another potential problem was probably related to blood flow; it was stated by Dr. Murphy that the earlobe was pricked with a sterile needle. Our experience over 30 years is that you almost certainly need to collect the earlobe blood sample in less than about 10 s; otherwise the \(P_O_2\) may well be affected. I believe this would be a very difficult task to carry out using a needle and that is why we use a number 15-scalpel blade which ensures a good blood flow with a collection sample time of less than 10 s.

I also noted that in Dr. Murphy’s paper, he found it necessary to squeeze the earlobe in order to obtain a sufficient blood flow. This is not good practice as mentioned in Professor Hughes ERJ editorial\(^5\); it would seem that the fluid collected from the cut earlobe is a mixture of blood from the capillaries and venules. When the ear lobe is squeezed, the capillary \(P_O_2\) will almost certainly be underestimated, as the blood being sampled is probably no longer 'arterialized' capillary blood.

References


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