Editorial comment

The role of nitric oxide *in vivo* feline erection under hypoxia—by Kim *et al*

The paper by Je Jong Kim *et al*¹ points to the importance of tissue oxygenation in the maintenance of cavernosal function. At first sight this may strike the reader as being intuitively obvious. However, there are implications that are very provocative and less obvious:

- In a multiple pathway system (as for erection) adverse metabolic conditions will probably affect pathways differently.
- Differential susceptibility to hypoxia will create dysregulation.
- Altered endothelial function will compromise neural constrictor and dilator responses.
- The time persistence of the insult and its consequences may cause profound changes later.
- Specific defects in the NO pathway may have implications for the choice of therapeutic strategies.

We know from this and many other papers that there are many systems contributing to erectile function, some in parallel (for example, cAMP and cGMP) and some in series (for example, cGMP and calcium channels). This paper suggests that there may be particular compromise of the cGMP pathway in hypoxia because non-oxygen-requiring cGMP pathway stimulation (as by SNAP) is ineffective. The impact of preferential cGMP pathway compromise is that dilation becomes more dependent on other dilator systems and the overall ability to oppose constriction is reduced.

There is evidence that periodic oxygenation, as with nocturnal erections, is important to the maintenance of normal acute and chronic function in the penis based largely on prostanoid metabolism.^{2,3}

Now we have to consider that the metabolic consequences of hypoxia are broader and of longer duration.

We should reinforce from these and other studies that gross hypoxic states such as are encountered in low flow priapism will produce profound metabolic consequences. The normal considerations of management with vasoconstrictors will only be valid transiently and as the hypoxia builds the cellular events will quickly become so distorted as to be outside the realm of logical normoxic physiology.

But this and other papers⁴ also have the subtle message that less profound hypoxic states may disable some systems preferentially and upset the usual regulatory balance. Chronic changes in the cGMP system may have profound therapeutic consequences.

References

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- 3 Daley JT *et al*. Prostanoid production in rabbit corpus cavernosum: I. regulation by oxygen tension. *J Urol* 1996; **155**: 1482–1487.
- 4 Kim N *et al*. Oxygen tension regulates the nitric oxide pathway. Physiological role in penile erection. *J Clin Invest* 1993; **91**: 437–442.

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