Ideal Kidney Oxygenation during Normothermic Machine Perfusion

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Normothermic Machine Perfusion (NMP) is a new technique for assessing, conditioning, and treating marginal donor kidneys. It aims to increase kidney transplantation following donation after cardiac death (DCD).^{1, 2}

Perfusion systems have historically supplied a gas mixture of **95% O₂** and 5% CO₂, but evidence suggests that supra-physiological oxygen delivery can be deleterious.^{3, 4}

We hypothesised that *excess oxygenation* of donor kidneys during perfusion may exacerbate ischaemic injury or abate the conditioning effect of NMP.

Study 1: Oxygenation and Renal function

- No difference in functional parameters
- Lower PO₂ did not cause medullary hypoxia

Study 2: Oxygenation and Reperfusion Injury / NMP conditioning

Conclusions

During NMP:

- Kidneys effectively autoregulate VO₂ to RBF
- Lower PO₂ did not adversely affect renal function
- Lower PO₂ did not lead to medullary hypoxia

During Reperfusion:

- Overall, lower PO₂ did not worsen reperfusion injury
- Lower PO₂ may be more protective than 95% O₂

References

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