Portable lung perfusion device could revolutionise transplant procedures

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Donor lungs are usually flushed and preserved at cold temperatures before transplantation. The cold temperature reduces tissue decomposition, but can also result in degradation of the organ and a longer transplantation process.

The newer process of normothermic perfusion – whereby the donor lung is flushed with a blood-like mixture of anti-rejection drugs, vitamins and hormones at a similar temperature to that of the human body internally, around 37°C – has the potential to greatly improve transplant success, as previous studies have shown that the lung suffers considerably less degradation through this process, compared to standard procedures. Normothermic perfusion also has the potential to renew suboptimal donor lungs, therefore vastly expanding the pool of adequately-functioning donor lungs.

Until now, the only devices capable of performing normothermic perfusion have been static, which has limited the practical potential of the technique, since to maximise its beneficial effects, normothermic perfusion needs to take place as soon as possible after the donor lung becomes available. This limitation has also meant that large-scale, randomised, clinical trials of the technique have been difficult to set up.

However, the new study, conducted in Germany and Spain, tested the safety and efficacy of a portable normothermic perfusion device, called the portable Organ Care System (OCS), on a group of twelve transplant patients. All twelve of the donor lungs in the trial were safely and

effectively preserved using the device, which means that large-scale clinical trials can now take place to assess the performance of normothermic lung perfusion against standard cold-storage techniques.

According to one of the study's authors, Dr Gregor Warnecke at the Hanover Medical School in Germany, "Our first-in-man data for the use of the OCS lung in clinical transplantation provide the first evidence for good outcomes of lung transplantation in a high-risk patient population. This is, of course, a proof-of-concept study, and the effectiveness of the device will need to be proven in large-scale trials. But nonetheless, the results are very encouraging and we now look forward to undertaking further research on this exciting technique."

Another study author, Dr Javier Moradiellos at the Hospital Universitario Puerta de Hierro in Madrid, Spain, adds that, "These early data also show promising potential for OCS in the assessment of uncontrolled non-heart beating donors and in maintaining the viability of lungs for extended periods of time. The over-ten-hours preservation in one of the study subjects is the longest clinical ex vivo perfusion achieved to date."

Writing in a linked Comment, Dr Jose Borro at A Coruña University Hospital in Spain, adds, "The mobility of OCS Lung certainly brings about a reduction in cold ischaemia time and allows continuous monitoring of the process, and the device's portability will surely open new avenues for development of ex-vivo lung perfusion. The data in this study are promising, but we should be cautious in our expectations until the results of the ongoing large clinical trial are reported, which could confirm the efficacy and safety of this ex-vivo lung perfusion device."

More information: www.thelancet.com/journals/lan … (12)61344-0/abstract

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