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LUNG TRANSPLANTATION AFTER EX VIVO LUNG PERFUSION: IS THE QUALITY OF RECONDITIONED ORGANS AS GOOD AS THE STANDARD ONES?

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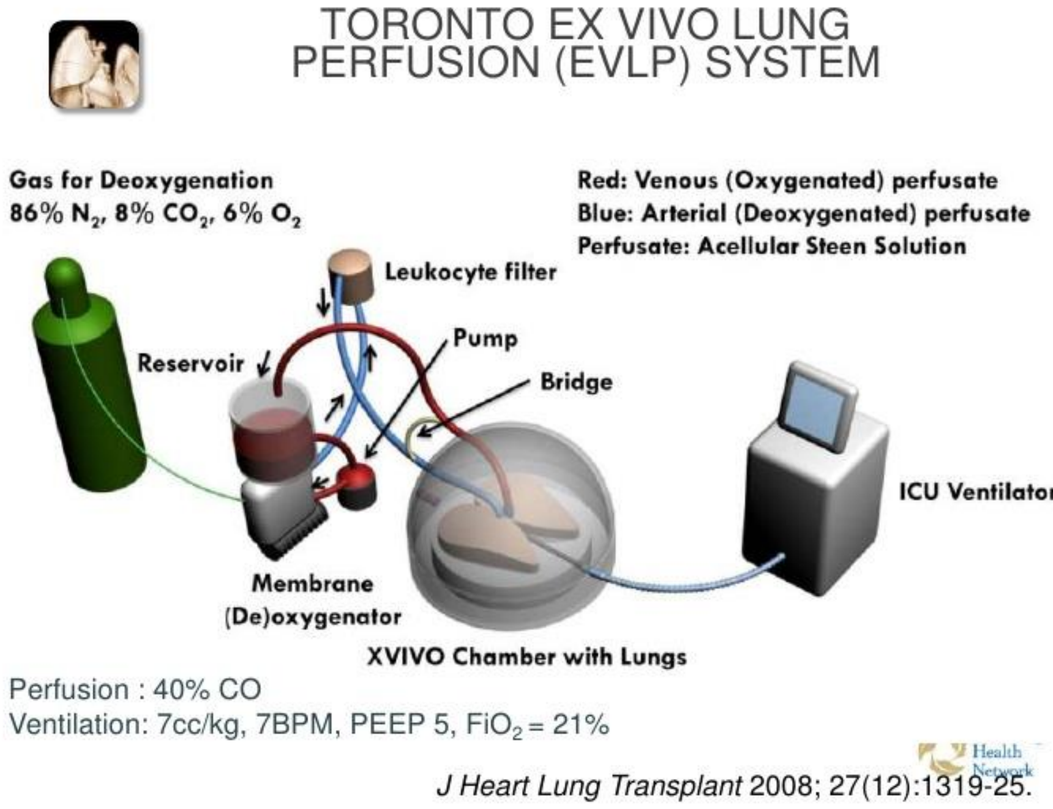
INTRODUCTION

- Lung transplantation (LTX) only chance for long-term survival for patients with end-stage lung diseases
- Only 15 – 30% of available donor lungs are suitable for transplantation
- To expand this possibility ex vivo lung perfusion (EVLP) has been established for marginal donor lungs
- Three different approaches worldwide: "Toronto", "Lund" and "Organ Care System" protocols
- They distinguish in terms of equipment, perfusate composition, perfusion and ventilation strategy
- This study investigated early clinical outcomes after LTX and compared the standard procedure (StLTX) to transplantation after EVLP reconditioning (EVLP-LTX) with regard to the used EVLP protocol



Research-Question:

"Effects a pretreatment of donor lungs with an ex vivo lung perfusion the early clinical outcome after lung transplantation compared to lungs transplanted conventional and what differences arise from the different EVLP protocols?"

MATERIALS AND METHODS

- *Systematic literature review* 11/2015 – 01/2016
- *Databases:* Pubmed and Cochrane (Publications in English)
- Selection of 11 clinical trials (2009 – 2015)
- *Keywords*: ex, vivo, lung, perfusion, lung transplantation
- *Parameters:* Postoperative mechanical ventilation hours (MV), length of ICU stay (LOS-ICU), length of hospital stay (LOS-HOS), 30-day-survival-rate, 1-year-survival-rate

In addition, four interviews were conducted with experts in this matter to validate findings. These experts were: Paulo Pego Fernandes (University of Sao Paulo, Brasil), Ilhan Inci (University Hospital Zurich, Switzerland), Richard Ingemansson (Lund University, Sweden) and Andreas Wallinder (University of Gothenburg, Sweden).

RESULTS

No significant differences could be found between the two groups (EVLP-LTX and StLTX) in the studied parameters (mean values, paired T-Test):

	MV (h)	LOS-ICU (d)	LOS-HOS (d)	30-day-survival (%)	1-year-survival (%)
EVLP	55.43 (n=136)	34.96 (n=151)	36 (n=129)	98.95 (n=125)	86.67 (n=96)
Standard-LTX	66 (n=528)	6.56 (n=675)	31.36 (n=647)	95.28 (n=527)	88.27 (n=380)
	p = 0.7940	***p = 0.42***	***p = 0.4***	***p = 0.0755***	***p = 0.8593***
Lund-Protocol	24 (n=25)	10.16 (n=40)	43.25 (n=33)	100 (n=23)	83.33 (n=15)
Toronto-Protocol	28 (n=96)	9.75 (n=96)	28.75 (n=96)	97.56 (n=90)	90 (n=81)
	p = 0.3125	***p = 0.9282***	***p = 0.1162***	***p = 0.1198***	***0.7319***
OCS-Protocol	40.95 (n=15)	147.4 (n=15)	N/A (not available)	100 (n=12)	N/A
Lund/Toronto	***p = 0.3775/0.5571***	***p = 0.1287/0.1903***		t-test not feasible	

- No significant differences between the three EVLP protocols
- Number of values for Organ Care System too small to perform valid statistical analysis
- Results confirmed by the interviewed experts

DISCUSSION

- All procedures are comparable to the standard protocol
- Experts confirm the findings of literature
- Individual motivation for choosing the protocol
- EVLP offers a reliable tool to expand donor pool for lung transplantation
- Safety and reliability of the procedure were shown in different studies
- But… the procedure is expensive, demands time and requires a number of specialized staff
- Usability depends on the location of transplantation center, social and health systems of the country
- All three used EVLP-protocols offer good quality comparable to standard procedure

CONCLUSION

1. Treatment of donor lungs with EVLP is safe and has no negative influence to the early postoperative outcome after lung transplantation.
2. The EVLP provides an opportunity to improve the usability of donor lungs.
3. EVLP will not replace the StLTX (too expensive, time wasting and prolongation of the warm ischemic time)

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For complete references please contact the author.

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