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# Assessing the effect of vasodilator in an ex-vivo nomothermic kidney perfusion porcine model

A. Gutierrez-Dalmau, V. Alastrue, A. García de Jalon, M. Sánchez, VP. González, A. Roncalés, J. Gómez-Arrue, C. del Agua, N. Romero, C. Pastor, B. Sáez, LM. Esteban, MJ. Gil, M. Doblaré, A. Borque-Fernando

MP10
Kidney ischemia and reperfusion

MP109

Department of Nephrology[1], Urology[2], Hematology[3], Pathology[4], and Biochemistry[5], Hospital Universitario Miguel Servet. IIS Aragon, Spain; EBERS Medical Technology SL, Zaragoza, Spain[6]; Service of Experimental Surgery, IACS, Spain[7]; Faculty of Health Sciences, Universidad San Jorge, Spain[8]; EUPLA, Universidad de Zaragoza, Spain[9]; Department of Mechanical Engineering, Universidad de Zaragoza, Spain[10];

## Introduction

A short period of isolated normothermic perfusion (NP) can be used to preserve, evaluate and repair the donated kidney after periods of warm and cold ischemic injury. However, the restoration of the organ function during NP is conditioned by the composition of the perfusate.

## Objectives

We have assessed the influence of the vasodilator in preservation and resuscitation NP

## Methods

After retrieval, porcine kidneys were exposed and subjected to 30 min of warm ischemia before being flushed with Ringer's lactate at 4°C. Kidneys were then either directly subject for 3 hours to ex vivo NP with the ARK NP system developed by EBERS (preservation group) or stored in ice for 22 hours with Custodiol HTK before the 3-hour NP (resuscitation group), and perfused with 2 different vasodilators; alprostadil 180 ng/h or verapamil 0.25 ng/h. The ARK system is formed by a portable preservation unit, which features peristaltic and infusion pumps, heating and oxygenation systems, sensors and a control unit; and a disposable closed circuit, where the organ and the perfusate are contained in sterile conditions.

| Exp group | Vasodilator | WIT | CIT | NP | n |
|---|---|---|---|---|---|
| GA1 | Alprostadil | 30 min | - | 180 min | 5 |
| GA2 | Alprostadil | 30 min | 22h | 180 min | 5 |
| GV1 | Verapamil | 30 min | - | 180 min | 6 |
| GV2 | Verapamil | 30 min | 22h | 180 min | 5 |

## Results

Fig. 1

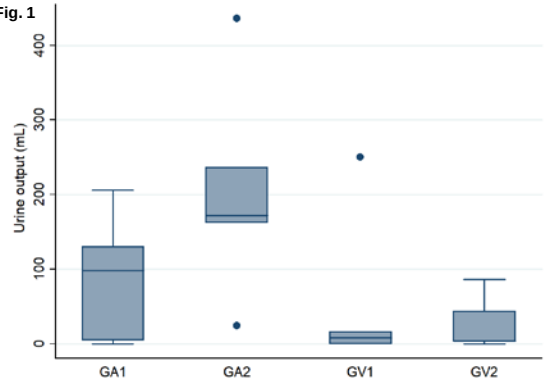



Fig. 2

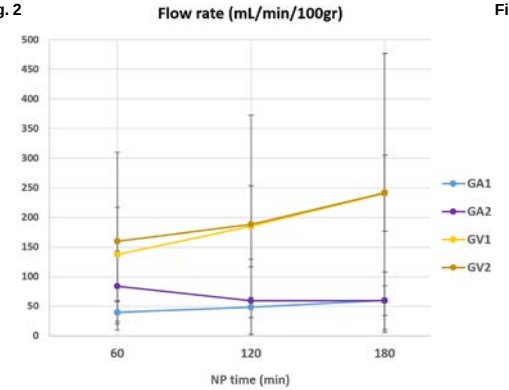
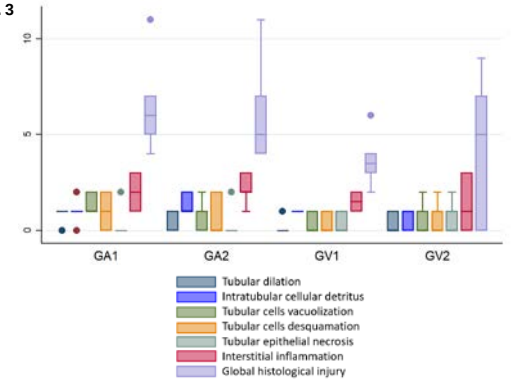



Fig. 3




The ARK NP system was able to maintain physiological levels of temperature (38ºC), mean arterial pressure (80 mmHg) and arterial O2 saturation (99%) in all cases during NP. In both, preservation and resuscitation groups, kidneys perfused with alprostadil exhibited stable flow rates during NP, whereas organs preserved with verapamil experienced increasing flow rates in time, which were significantly higher than those obtained with alprostadil (Fig. 2; GA1 59.8±24.9, GA2 66.8±48.2, GV1 240.9±64.7, GV2 241.7±235.6 mL/min/100g; $p < 0.0408$). Conversely, urine output was not significantly different between the alprostadil and verapamil groups (Fig. 1). No significant difference was found between groups in histological (Fig. 3) and tissue damage parameters (GGT, LDH)

## Conclusions

Verapamil led to lower values of intrarenal resistance and higher flow rates than alprostadil, without increased diuresis. Hemodynamic parameters during NP are determined by multiple factors and do not directly correlate with integrity of the organ. The ARK system was able to preserve kidneys in NP under controlled conditions.

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