Minimally invasive surgery has been recently introduced for kidney donor and recipient undergoing kidney transplantation. This approach had increased possibilities for more difficult surgeries to be performed, especially in case of morbid obesity patients and deep and narrow operative field (Giedelman CA et al. The impact of robotic surgery in urology. Actas Urol Esp.2013;37:652-7). Moreover, minimally invasive surgery leads to a significant reduction of recovery period and wound complication which results in an overall decrease of health-care costs (Tzventanov I et al. Robotic assisted kidney transplantation: our experience and literature review. Curr transp Rep.2015;2:122-126).

This entity is defined as the requirement for dialysis within the first week after kidney transplantation (Mallon DH et al. Defining delayed graft function after renal transplantation: simplest is best. Transplantation 2013; 96: 885-9). The main predictors of DGF are related to the donor renal function. Even if there is still an open debate among this topic, the shortening of ischemia time, especially warm ischemia time, seems to be a modifiable variable to reduce DGF.

The association between prolonged warm ischaemic time and adverse graft and patient outcomes is already well established in deceased donor kidney transplantation. Even if this relationship is less well established in live donor kidney transplantation, there is raising evidence that prolonged warm ischemia time has an adverse impact on clinical outcomes.

As a consequence, there is a need to improve the modalities of kidney preservation during transplantation surgery, in particular during some difficult procedures like live donor transplantation and RART.

A number of techniques of graft cooling have already been described, especially for laparoscopic surgery (primarily in partial nephrectomy). Landman J et al. proposed a method to achieve renal parenchymal hypothermia by using retrograde endoscopic cold saline perfusion. Through an ureteral access sheath previously positioned, renal pelvis was irrigated by a 3-L bag of frozen saline solution, achieving a renal cortical temperature of 24°C and a medullary temperature of 21°C (Landman et al. Renal hypothermia
achieved by retrograde endoscopic cold saline perfusion: technique and initial clinical application. *Urology*, 2003;61(5):1023-5). Unfortunately, all this technique are not routinely used because they are cumbersome and poorly reproducible.

On the basis of the current evidence, we hypothesize that the availability of a cooling graft device might facilitate the learning curve for live donor nephrectomy, live donor transplant and eventually RART, and minimize the risk graft function impairment.

Primary end point: to evaluate the impact of ischemia time on graft function in both deceased and live donor kidney transplantation.

Secondary end-points:

- To build a “cooling graft device” which allows to maintain the graft at low and controlled temperatures during the surgical procedure.

- To evaluate effectiveness, feasibility, reproducibility and costs of the device.

| Skills and competencies for the development of the activity | Surgical experience in the field of kidney transplantation, live donor nephrectomy and cadaver kidney harvesting preferably. Attendance on the specific field abroad is welcomed. |