

# ASSESSMENT OF BIOPSIES OF DONOR KIDNEYS PRIOR TO RENAL TRANSPLANT. COMPARISON AND VALIDITY OF DIFFERENT FREEZING METHODS.

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## INTRODUCTION

Histological evaluation of donor kidneys prior to transplantation is a mandatory practice in up to 60% of kidney transplants. There are several published scores that assess the following parameters: glomeruli, tubules, interstitium, arteries and arterioles. Microwave accelerated paraffin processors are not available in most centers and the sample is frozen for the study. Artifacts that occur in tissue in many cases prevents a proper assessment.

## MATERIAL AND METHODS



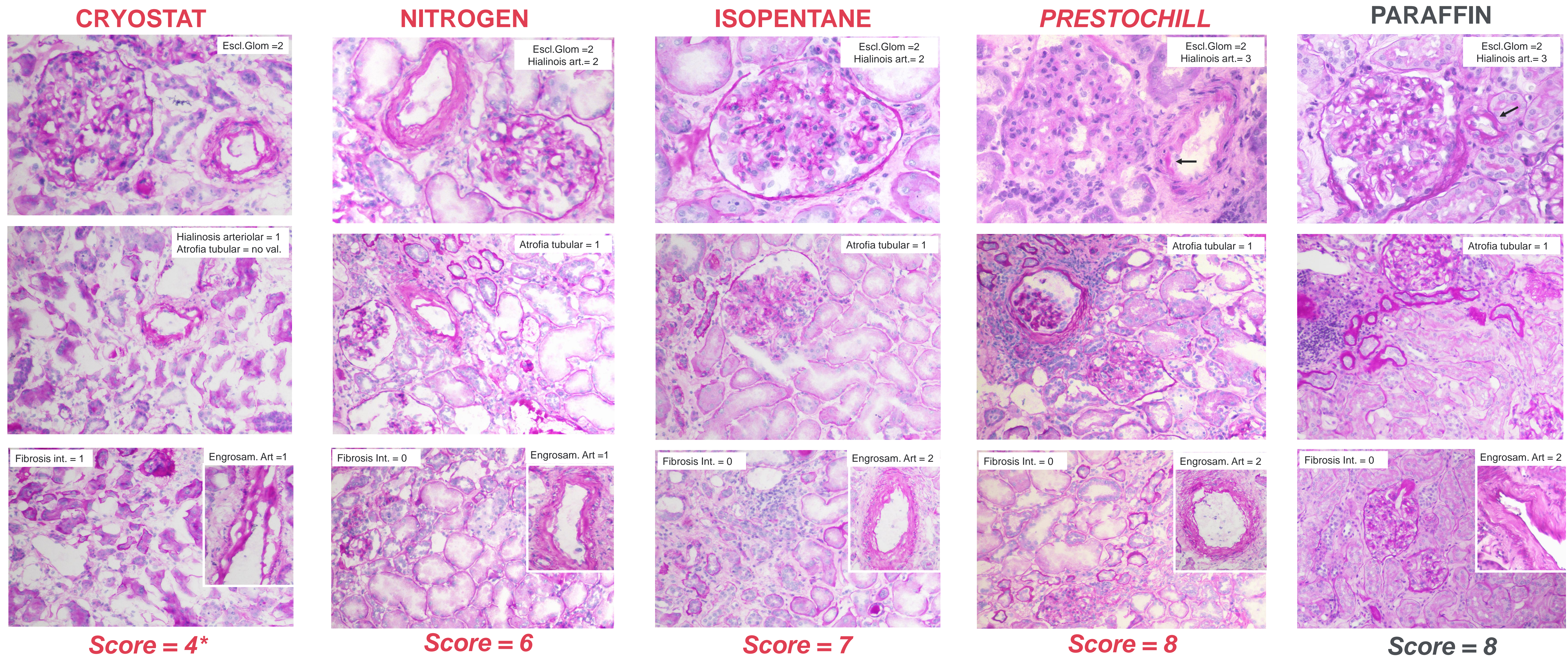
We took 5 samples from the same kidney, processing 3 of them with the most commonly used freezing methods: directly in cryostat, cryomould on liquid nitrogen and refrigerated isopentane, the 4th sample with a new ultra-fast freezing technique (Prestochill) and the 5th sample was processed in paraffin as quality control. The 5 cases were evaluated histologically applying the Serón criteria and comparing the results.

### Serón's criteria

- 1. Glomeruli sclerosed or with total atrophy due to cystification**  
0: Absence.  
1: 0-10%  
2: 11-20%  
3: >20%
- 2. Hyaline arteriolopathy**  
0: Absence of hyaline thickening  
1: Mild-moderate hyaline thickening in 1 arteriole  
2: Moderate-intense hyaline thickening in > 1 arteriole  
3: Intense hyaline thickening in most arterioles
- 3. Fibrous thickening of the vascular intima**  
0: Absence of chronic vascular lesions  
1: <25% vascular lumen reduction due to myointimal thickening  
2: 26-50% reduction in vascular lumen due to myointimal thickening  
3: >50% reduction of vascular lumen due to myointimal thickening
- 4. Tubular atrophy**  
0: Absence of cortical tubular atrophy  
1: <25% of atrophic cortical tubules  
2: 26-50% of atrophic cortical tubules  
3: >50% of atrophic cortical tubules
- 5. Interstitial fibrosis**  
0: ≤5% of affected renal cortex  
1: 6-25% of affected renal cortex  
2: 26-50% of affected renal cortex  
3: >50% of affected renal cortex

**Global Score**    **≤7: kidney suitable for transplantation**  
**> 7: kidney NOT suitable**

## RESULTS



## DISCUSSION

The freezing artifact in the tissue is directly proportional to the time spent in the process. Freezing in cryostat (simple but slow) produces large artifacts. The tubules collapse, making their correct evaluation impossible. To a lesser extent arteries and arterioles are also affected, so this is not recommended method for evaluating grafts. Liquid nitrogen, while freezing instantly, is unreliable for unpredictable results. Contact of nitrogen with OCT produces bubbles that can break the tissue. Furthermore, the gases on the nitrogen surface are at a higher temperature than nitrogen, so the freezing is not homogeneous. Immersion in refrigerated isopentane is at best free of artifacts as long as it is close to its freezing point, by immersing it in liquid nitrogen. However, it is a process that is difficult to reproduce in non-expert hands. Ultra Fast Freezing (PrestoCHILL) offers excellent artifact-free morphological results and is a simple procedure with high reproducibility.