VACUUM SEALING AND COOLING FOR A SAFE TRANSFER OF TISSUE FROM OPERATING THEATRE TO LABORATORY

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BACKGROUND: the pre-fixation "ischemia" time represents a potentially dangerous step affecting preservation quality of both structure and tissue components (proteins, nucleic acids). While **best practice requires immediate transfer of surgical specimens from theatres to Pathology laboratories, this is often impratical for structural reasons** and a series of alternatives have been devised. Most common worl-wide is the transfer of specimens in **formalin-filled boxes**, a practice which implies serveral drawbacks, both for tissue preservation and local environment.

DESIGN: In our Hospital (a large, pavillon hospital in Piedmont, Italy) the traditional habit of transferring specimens from the surgical theatre to the Pathology laboratory immersed in formalin was substituted by Under-Vacuum sealing (U.V.S.) using the Tissue-Safe© apparatus (Milestone, Soresole, Italy). Sealed specimens were kept at 4° C for 1-72 h until transfer. Grossing, fixation in Phosphate-buffered Formalin (PBF) and paraffin embedding followed.

The Tissue-Safe® apparatus is located in the premises of operating theatres.

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Tissue transfer to pathology labs: under vacuum is the safe alternative to formalin

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Vacuum-based preservation of surgical specimens: An environmentally-safe step towards a formalin-free hospital

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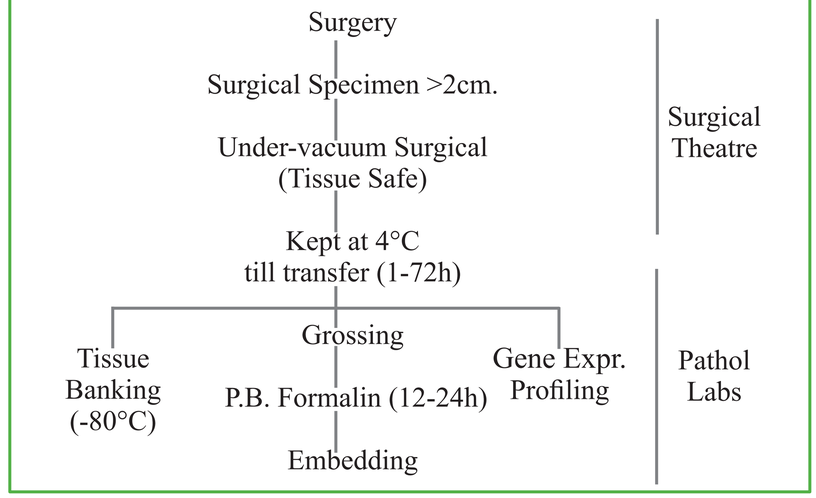
The procedure for handling biopsies since 2009



Results of a Survey among Staff Operators (October 2008 - April 2009)

Satisfaction: Low for formalin / High for U.V.S.C.

Handling & Gross Anatomy — U.V.S.C. no drawbacks

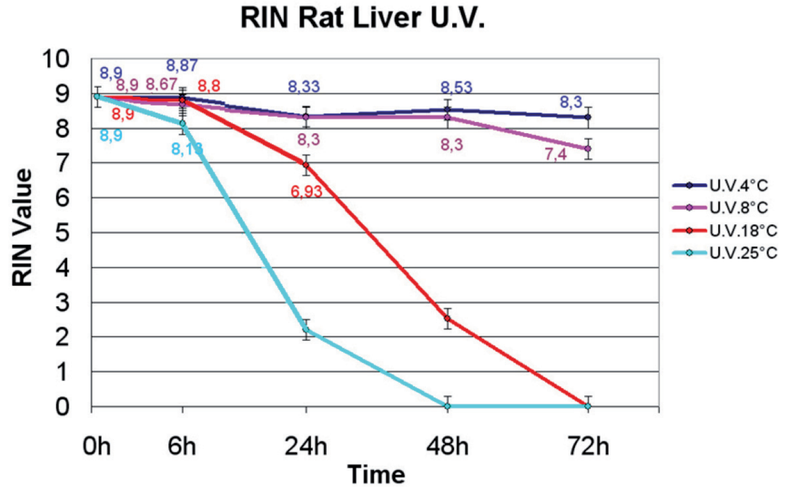
Histopathol & TCC — U.V.S.C. no drawbacks

TISSUES PRESERVED UNDER VACUUM & COOLING

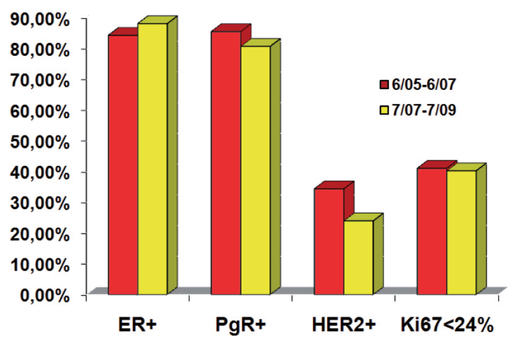
Merits:

- No more formalin in surgical theatre (except for small specimens, where pre-filled tubes are employed)
- No spilling
- No fumes
- No drying of tissues
- Colours preserved
- Lack of insulating air around tissues allows fast cooling
- Tissues (bags) light and easy to carry
- Structure (RNA, Antigens) preserved up to days
- Banking (selective) allowed
- Demonstration of operated tissues for students and surgeons

BREAST CANCER: One hundred twenty nine consecutive cases of breast cancer were stored in U.V.S. at 4° C for a time between 1 and 72 hours (mean 23 h), before grossing.
A specimen (punch biopsy) was taken, immersed in RNA later© and sent for Gene Expression Analysis (GEA). Evaluation of RNA values proved that in all cases the material was fit for GEA analysis (RIN value mean 7.9).



RNA Integrity Number (RIN) is heavily dependent from storing conditions. Optimal values are still obtained after 72 hours, in U.V.S., cooled specimens.



ICC evaluation of therapeutic/prognostic paremeters in a continuos series (N=375) of breast cancers Years 6/05-6/07 vs. 7/07-7/09.

RESULTS: Under Vacuum Sealing and Cooling (U.V.S.C.) is well accepted by both Surgery and Pathology staff and this procedure, now in use since 2 years, assured proper histological and immuno-histochemical quality as well as RNA preservation (RIN values above 7).

CONCLUSIONS: Tissue transfer in U.V. and cooling conditions meets the request of health authorities and involved personnel in order to reduce exposure to formaldehyde. Absence of air favours the cooling of specimens (because of the absence of insulating air) and gives rise to a relatively small, light and safe bag, easy to carry as compared to formalin-filled containers. The transfer in U.V.S.C. assured standard quality for structural, antigenic and nucleic acid analysis.

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