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Body Composition and nutritional status using BIVA technology

Science in body composition

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The importance of body composition monitoring for surgical patients

Enhanced recovery after surgery (**ERAS**) protocols are standard, organized, multimodal perioperative care pathways designed to achieve early recovery after surgical procedures and are based on the best scientific evidences.

The **goals of all society ERAS** guidelines are to maintain preoperative organ function and reduce the profound stress response after surgery; the aim is early and safe recovery for the patient, both during hospital stay but also following hospital discharge.

Nutritional and hydration monitoring can support early identification of clinical prognostic indicators: **patient outcome is improved and hospital stay is reduced**.

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NUTRILAB™ device **supports the ERAS** (Enhanced Recovery After Surgery) **protocols**

	PREHABILITATION	PREOPERATIVE PHASE	INTRAOPERATIVE PHASE	POSTOPERATIVE PHASE
ERAS PROTOCOL TIPS	It is recommended a few weeks prior to surgery that the patient: • Adopts a healthy and balanced diet. • Refrains from smoking. • Refrains from drinking alcohol • Conducts adequate physical activity. By following these recommendations, the inflammation state reduces, the hydration status improves thus promoting the release of myokines. This impacts positively on perioperative outcomes and therefore hospital stay is reduced	It is recommended in this stage: • Adequate nutritional support. • Maintenance of patient in an euvolemic state (to avoid poor or excessive intake of fluids, that would affect organ perfusion, cardiac activity and favor the onset of respiratory and renal complications). **In the screening phase >** preoperative malnutrition increases morbidity and post-operative mortality. **During surgery >** in patients with intentional weight loss of >10 %, malnutrition increases the risk of complications.	The intraoperative phase extends from the time the patient is admitted to the operating room, to the time of anesthesia administration, performance of the surgical procedure and until the patient is transported to the recovery room. During surgery, intra-operative fluid management and patient water balance are often difficult to address. Managing and preventing fluid overload or deficit has a high level of recommendation.	The main objective of the ERAS guidelines is to ensure faster recovery and early hospital discharge, of course, with fewer complications. Typical post-operative complications derive from fluid management. Patients with post-operative fluid overload are normally treated with loop diuretics or aquaretics, and this, if not adequately managed, may cause dehydration. In order to avoid this risk, that can lead to Acute Kidney Failure (AKI), intravenous administration of these drugs should be interrupted when the correct water balance is achieved.
NUTRILAB SUPPORT TO ERAS PROTOCOL TIPS	Thanks to the sensitivity and specificity of the vectorial technique (BIVA) for fluid assessment, the Nutrilab™ bioimpedance analyzer offers accurate information on the hydration status of the patient, thus identifying dehydration or fluid overload Also, by monitoring the patient's **Phase angle (PhA)** It is possible to verify the effectiveness of the physical activity that he is conducting.	The quantitative and qualitative assessment of body composition allows to assess the level of malnutrition **Nutrigram®** scale, identifying conditions of pre-sarcopenia, sarcopenia, or "low muscle" down to severe malnutrition. Thanks to the sensitivity of the BIVA technique and the reliability of specific predictive estimates, it is possible to adjust the nutritional plan accordingly in a more specific and accurate way.	Individual response to infusion therapy can be monitored by controlling tissue hydration with the **Hydragram®** scale. Adequate tissue hydration correlates positively with better clinical outcomes.	To verify the patient responsiveness to a given diuretic therapy it is possible to monitor his hydration status using the Hydragram index. This validated and accurate scale can be adopted more then once a day, and helps in preventing : • acute dehydration with consequent oliguria/anuria; • excessive infusion with the risk of cardiopulmonary complications and accumulation of fluids in the third space.

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NUTRILAB™ is a unique portable multifunction touchscreen bioimpedance system, able to perform **nutrition** and **hydration analysis directly at the patient's bedside**.

The analyzer displays on its screen all body composition parameters and estimates, together with the relative reference values. Test results can be stored in the device database and subsequently downloaded for further assessments on the dedicated software platform, Bodygram HBO, installed on PC.

Through the bioimpedance analysis, **NUTRILAB™ offers an immediate overview of the nutritional status** and the possible presence of malnutrition, intra and extracellular water balance, fluid overload or dehydration state, cellular viability or depletion.

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NUTRILAB™ also allows to manage:

- The nutritional risk by validated screening questionnaires embedded in the user interface (MNA®, Must®, NRS 2002).
- A rapid and automatic calculation of the waist/hip ratio for cardiovascular risk assessment.
- The calculation of the nutritional indices BCMI, SMI, ASMMI and FFMI.
- Immediate visualization of the hydration and nutritional conditions through the validated colorimetric scales “Hydragram®” and “Nutrigram®”.
- Compliance to the GLIM criteria.

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