VENTILATION
SERVO-i WITH NAVA
FREEING THE FULL POTENTIAL
OF SYNCHRONY

This document is intended to provide information to an international audience outside of the US.
NAVA®: Neurally Adjusted Ventilatory Assist (NAVA) is a unique approach to mechanical ventilation based on neural respiratory output, in connection with invasive and non-invasive NAVA.

The act of taking a breath is controlled by the respiratory center of the brain, which decides the characteristics of each breath, timing and size. The respiratory center sends a signal along the phrenic nerve, excites the diaphragm muscle cells, leading to muscle contraction and descent of the diaphragm dome. As a result, the pressure in the airway drops, causing an inflow of air into the lungs.

With NAVA, the electrical activity of the diaphragm (Edi) is captured, fed to the ventilator and used to assist the patient’s breathing in synchrony with and in proportion to the patient’s own efforts, regardless of patient category or size. As the work of the ventilator and the diaphragm is controlled by the same signal, coupling between the diaphragm and the SERVO-i® ventilator is synchronized simultaneously.

Synchrony in invasive NAVA.
NIV NAVA®: In conventional non-invasive ventilation (NIV) patient-ventilator asynchrony is common. Scientific studies suggest that leaks play a major role in generating patient-ventilator asynchrony and discomfort. In infants and neonates, conventional NIV may be complicated by leakage and also because the effort by the infant has been too weak to be reliably detected by the ventilator’s pressure and flow triggers.

NIV NAVA is neurally controlled non-invasive ventilation. NIV NAVA will provide synchronized assist, independent of conventional pneumatic sensors and leakage associated with patient interfaces. NIV NAVA manages asynchrony, as the mode does not rely on a pneumatic signal and is not affected by auto PEEP. Breath triggering and cycle off are not affected by leakage, and every patient effort – independent of type of interface – is assessed and responded to equally effectively for all patients from adult to the smallest neonates.

NAVA and the breathing process

1. The brain's respiratory center sends a signal...
2. ...which travels via the phrenic nerve and...
3. ...excites the diaphragm.
4. The Edi catheter with the electrodes positioned at the level of the diaphragm captures the electrical activity of the diaphragm (Edi).
5. The Edi signal is sent to the SERVO-i® ventilator which synchronizes the ventilation in proportion to the patient’s own breathing efforts.

Synchrony in NIV NAVA.
SERVO-i WITH NAVA
THE BENEFITS

Synchrony redefined: In NAVA®, the ventilator delivers assist in proportion to patient demand, and the patient and ventilator are always in synchrony. This benefits the patient, as the synchronized respiratory assist enables lower assist levels, and eliminates the mismatch in pneumatic timing of inspiration and expiration, avoiding the risk of missed efforts. NAVA provides a smooth transition to natural breathing.

Edi – the respiratory vital sign: The Edi signal is a unique parameter in mechanical ventilation. It can be used as a diagnostic tool to monitor the electrical activity of the diaphragm (Edi) in any situation for your patients with breathing difficulties, in any ventilation mode as well as in standby after extubation. In all ventilation modes, the Edi curve and its associated value can provide information on respiratory drive, volume requirements and the effect of the ventilatory settings, and can be used to gain indications for sedation and weaning, as well as continuous insight into the patient diaphragmatic status. All the trends and changes in the patient’s respiratory drive are recorded and saved.

Decision support for intubation or extubation: The Edi signal also indicates patient condition. An increasing Edi may signify increasing weakness or worsening of the patient condition, as objective criteria for intubation decisions. As the patient’s condition improves, the decreasing Edi amplitude and pressure drop is an indicator to consider weaning and extubation.

Decision support for unloading and assist titration: The Edi signal enables the clinicians to set the assist level from the ventilator, and to optimize unloading. PEEP titrated to the lowest Edi amplitude means that work of breathing is minimized. As the patient’s condition improves with NAVA, Edi amplitude decreases, resulting in a reduction in ventilator-delivered pressure.
Patient comfort: With NAVA®, the respiratory muscles and the ventilator are driven by the same signal. The delivered assistance is matched to neural demands. This synchrony between patient and ventilator may minimize patient discomfort and agitation, promoting spontaneous breathing, providing for improved sleep quality and possibly reducing sedation.

Decreasing the patient’s pressure load and risk of over-assist: With NAVA, the patient’s own respiratory demands determine the level of assistance. The use of NAVA helps avoid over- or under-assistance of the patient. In an increasing number of clinical studies, NAVA has been associated with lower peak airway pressures, compared to conventional mechanical ventilation with Pressure Support.

In neonatal and pediatric intensive care patient populations, ventilation with NAVA was associated with improved patient-ventilator synchrony and lower peak airway pressure when compared with Pressure Support ventilation.

In addition to limiting the risk of overassist, NAVA has been found to prevent patient-ventilator asynchrony and improve overall patient-ventilator interaction in adult intensive care patients. NAVA was also associated with unloading of the respiratory muscles.

Improved patient comfort
Decreasing the patient’s pressure load and risk of overassist
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NAVA® – independent of type of interface.
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WITH NAVA
TENTIAL OF SYNCHRONY
SERVO-i WITH NAVA

AN ESTABLISHED TREATMENT WORLDWIDE

NAVA® is used in intensive care units in countries all around the world for neonatal, pediatric and adult patients. Clinical evidence for NAVA has been documented in multiple clinical studies in scientific peer-reviewed journals, a body of work that continues to grow exponentially every year.

Peer-to-peer forum for sharing NAVA experience

The magazine Critical Care News and its associated website, www.criticalcarenews.com is a forum hosted by MAQUET Critical Care for intensive care clinicians to share clinical experience of NAVA. The website is a primary source of user information about NAVA and NIV NAVA, and contains up-to-date lists of clinical literature reference lists, patient case reports about the use of NAVA in neonatal, pediatric and adult patients, as well as numerous NAVA lectures and interviews with intensive care physicians about NAVA.
Critical Care | SERVO-i with NAVA

REFERENCES

Selected publications on the topic of NAVA® and NIV.


For more comprehensive lists of scientific studies on the topics of NAVA and NIV, please refer to www.criticalcarenews.com and select topic under Reference List.
In healthcare, it is a well known fact that the best interventions are those that interfere least with nature’s own mechanisms.

The MAQUET philosophy is that technical innovation must promote and support the body’s natural functions. The MAQUET mission is to provide clinicians with tools to amplify the patient’s own recovery efforts.

SERVO-i® is a platform that has been extended with an interactive ventilation therapy – NAVA®. A unique breakthrough in ventilation, NAVA puts the patient’s respiratory center in direct control of SERVO-i mechanical support, breath by breath.

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The product NIV NAVA may be pending regulatory approvals to be marketed in your country. Contact your local Maquet representative for more information.

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