Customer reference:
PulmoVista® 500 in everyday clinical routine

There are patients in the intensive care unit of Garibaldi Hospital in Catania, Sicily, whose vital bodily functions are defective or have failed and require mechanical ventilation. Using the PulmoVista® 500, the ventilation of these patients is made continuously visible in real time, thus enabling an individualised respiratory therapy guidance.

Ventilation of the lungs should be adapted as exactly as possible to the current requirements of the affected organ and the patient. In order to prevent atelectasis on one side and overdistension on the other side, a balanced adjustment of the various ventilation parameters must be made for the individual patient.

If the ventilation is set too aggressively, cellular structures in the lungs can be destroyed. The possible consequence: An interstitial oedema or even a multi-organ failure, also caused by the systemic release of cytokines. If, on the other hand, the ventilation is not sufficient, the alveolars in the dependent lung regions can collapse: An arterial hypoxia develops.

As Professor Sergio Pintaudi, chief physician for anaesthesiology and intensive care at the Garibaldi Hospital knows these risks, he uses PulmoVista 500 for ventilated patients. He calls the device an ‘assistant’ and a ‘good companion’ of an intensivist. Pintaudi believes there is not just the one specific therapy for the lungs. He says:

“However, there is the therapeutic strategy, which enables us to provide good treatments for lung conditions. PulmoVista 500 and thus optimal monitoring of the lungs are included in this therapeutic strategy.”
Apart from patients with lung diseases there is mostly taken care of post-operative and post-neurosurgical patients in the intensive care unit of Garibaldi Hospital. They remain intubated or tracheotomised for several days, sometimes weeks. “It’s a bit like a dog that bites itself in the tail”, Professor Pintaudi explains the connection.

“The casualty with a cranial or vascular-cranial injury has a malfunction of the entire system and the respiratory system is thus also affected by the cranial trauma. The respiratory system influences the course of the cranial trauma. To treat the lungs in an optimal way also means providing the brain with a good treatment.”

The PulmoVista 500 is intended for use on intensive care patients whose regional ventilation distribution is of clinical interest. It can help find the appropriate ventilation pressures like, the suitable positive end-expiratory airway pressure (PEEP), and thus prevent atelectasis or overdistension. Scientific clinical studies have shown that both responders and non-responders to recruitment manoeuvres can be identified with the aid of electrical impedance tomography (EIT). Furthermore, quick changes in the lung volume during the endotracheal suctioning can be detected. The technology is also used as an additional monitoring tool when positioning a double lumen tube. And in the case of patients with acute respiratory failure, electrical impedance tomography helps to check the effect of repositioning the patient from a supine position to a prone position and vice versa.

“The innovative Dräger device can be used for a very wide spectrum of patients,” also says Andrea Leuzzi, senior physician in Professor Pintaudi’s team. From his point of view, PulmoVista 500 can also be used, for example, on patients post-operatively, with a cranio-cerebral injury or with classic primary lung diseases. The main focus is on cases of pneumonia or exacerbated COPD, rarely the treatment of an acute respiratory failure. In these cases the ventilator is also combined with PulmoVista 500:

“To begin with, we used the device on a high number of patients, independent of the impairment of the lung, in order to gain experience of handling the new device”, explains the intensivist. “Then, and that is what we are doing now, we used PulmoVista 500 on patients with serious respiratory problems. We can now work with PEEP values that we never thought would be possible.”

Intensive care nurse Salva Barbarino also feels a lot more independent in his work thanks to PulmoVista 500: When he looks at the monitor on the device and notices that, for example, the right lung is hypoventilated, he can focus on the further treatment of this lung.

For the team of doctors and nurses, the extensive examination of patients with lung diseases usually also means repeatedly bringing them to the CT scan. The layout of the buildings poses an additional problem at the Garibaldi Hospital in Catania: The departments are not in the same building. The intensive care unit and radiology unit, where CT scans are performed, are not even within sight of each other and are located in different buildings. Professor Pintaudi and his doctors must therefore deliberate on every CT scan and even order an ambulance for the transportation, which is an additional cost/time factor. In this case too, the acquisition of PulmoVista 500 improved the situation: “PulmoVista 500 can best be
compared to a continuous computer tomography on a functional level", says Professor Pintaudi and describes the effect of the unit in a few words: “Normally we perform a computer tomography on our patients upon admission, halfway and then at the end of the treatment. We have noticed that PulmoVista 500 meets our requirements because we reduce CT scans in the course of the treatment.”

Dr. Salvatore Torrisi, responsible for procurement and finances in the administration of the Garibaldi Hospital, is also convinced by the economic benefits of the acquisition: “The way in which such a device is evaluated must be different; it must take place with reference to the overall benefit of the treatment.”

Professor Pintaudi and his team are now curious about which long-term successes the PulmoVista 500 will bring. He would very much like to exchange experiences with other colleagues that use the device: “Those who have expert knowledge about the application can be of great help to other colleagues by passing on their experiences.” It will probably only be a matter of time until direct lung function monitoring with the aid of EIT becomes as well in other hospitals a part of everyday clinical routine.

**BRONCHOSCOPY**

“Cleaning the lung is the first step in the event of a contused or restricted lung”, explains Professor Sergio Pintaudi. He has developed a suitable concept for the use of bronchoscopy in his intensive care unit, in which patients, for example, with pneumonia or COPD, after cancer operations or cranio-cerebral injuries are treated. PulmoVista 500 from Dräger has been included in this ‘protocol’ thanks to its capability to display the distribution

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**CT scans for ventilated patients**

CT scanning is being used regularly for differential diagnosis of critically ill patients. It has been estimated that in 24 % to 75 % of ICU chest CTs the shown information is rated "clinically useful". Especially for ventilated patients, chest CT scans are used to image the air content in the different regions of the lungs.

However, its use on ICU patients remains restricted due to the risks and costs associated with the need for patient transport and radiation exposure.

of ventilation in the lung regions. The device, according to Pintaudi, gives the doctor a ‘look in real time’ at the lung during the bronchoscopy: “The ventilated lung regions of the patient can change during the examination. We then decide which regions we are going to treat. We can see directly how much of the lung we can ventilate. This is important for us because it gives us a direct, primary indication of the effect of our therapy.”

Sometimes there are clinical signs, sometimes a CT scan at the beginning of the intensive care treatment, whereupon an examination or treatment of the lung by means of bronchoscopy is determined. “Nowadays”, says Pintaudi, “we no longer perform CT scans after a lung treatment using fibrobronchoscopy because we have PulmoVista 500.”

Analysis of collected data with the ‘trend view’. For Intensive Care Nurse Salva Barbarino PulmoVista 500 is “not only an advisor but as well a good friend who guides me in my work and in assisting the patients”.

With the application of PulmoVista 500 during a bronchoscopy some complex, expensive and risky transports to the CT scans can be saved.
Professor Sergio Pintaudi is chief physician at the department for anaesthesiology and intensive care ‘A. Caruso’ at the Garibaldi Hospital in Catania. For a few months now, PulmoVista 500 from Dräger has been an integral part of the technical equipment in his intensive care unit. The device supports Pintaudi in his efforts to improve the ventilation of patients in the intensive care unit. His conviction: “The lung is the most complex organ for the intensive care physician. The better the monitoring of the ventilator, the better the outcome for the patient.”

Andrea Leuzzi is senior physician at the department for anaesthesia and intensive care ‘A. Caruso’ at Garibaldi Hospital in Catania. He points out the many different applications PulmoVista 500 has: From rather more common, primary lung diseases such as pneumonia, the ventilation of septic patients and also special use for acute respiratory failure. The visual options of the PulmoVista are ‘fascinating’.

Like other colleagues in the intensive care unit team at Garibaldi Hospital, Salva Barbarino is also happy about the time that has been gained through the acquisition of PulmoVista 500: Several time-consuming transports in the ambulance to the CT department are no longer necessary because the device provides important information on and images of the ventilation of the different lung regions directly in the intensive care unit. “However, it is not only the time we save. We also move the patient – who is often seriously injured or ill – less.”

Dr. Salvatore Torrisi is head of the purchasing department at Garibaldi Hospital in Catania and purchased PulmoVista 500 from Dräger upon the advice of Professor Pintaudi. For him, the main emphasis was not so much on the price of the device, but the additional benefit that its use would bring. “It does not make sense to concentrate on the monetary value of the device, which is only a relative value compared to that of the practical benefits in patient care.”
About the hospital
The Garibaldi Hospital is located in the centre of Catania on the Italian island of Sicily. The hospital has 650 beds. Tumour surgery bariatric surgery and neurotraumatology are core areas in the operative sector. All operative disciplines with the exception of cardiac surgery are performed here. Furthermore, the hospital is well known for its above-average treatment options after strokes and other neurological emergency cases.