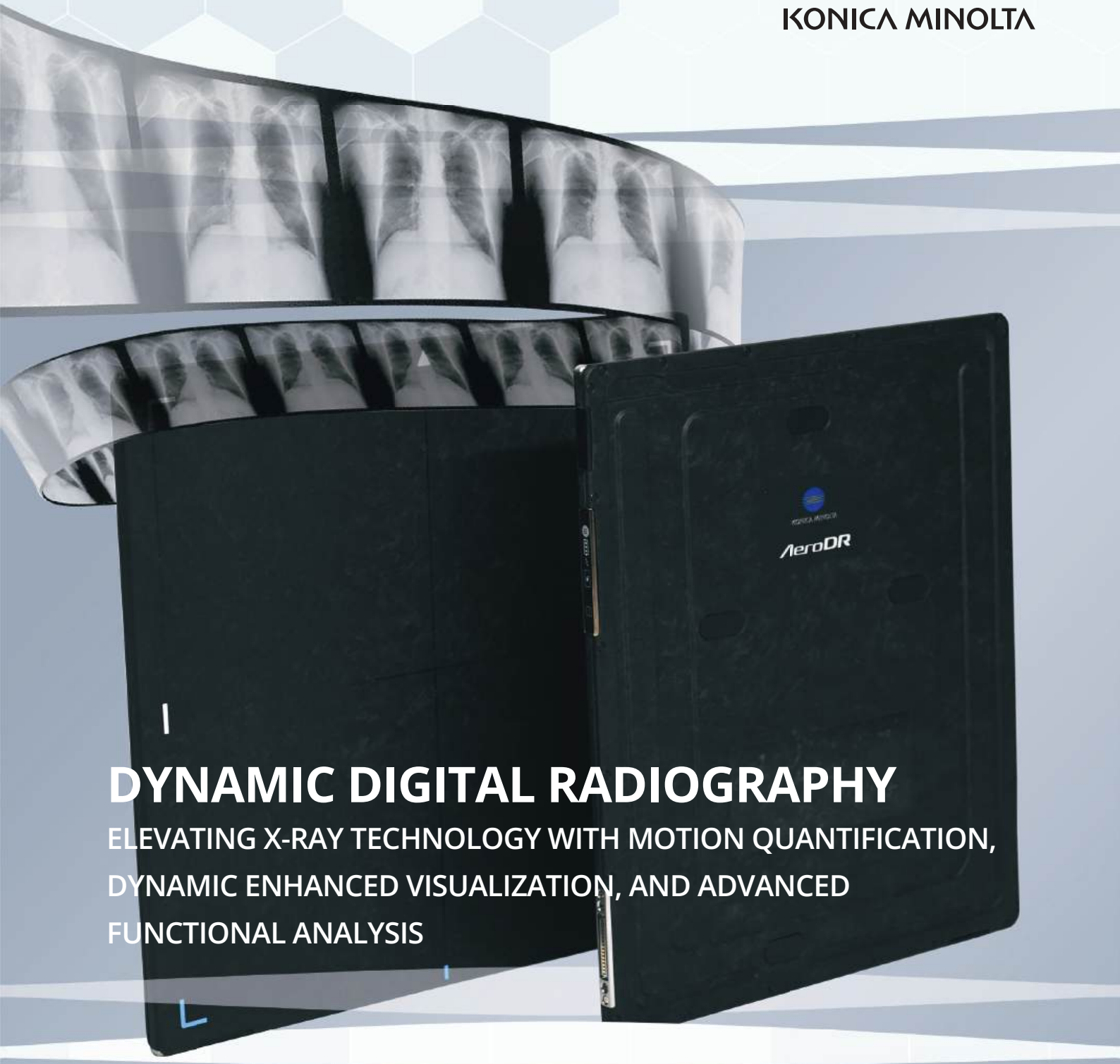
KONICA MINOLTA



DYNAMIC DIGITAL RADIOGRAPHY

ELEVATING X-RAY TECHNOLOGY WITH MOTION QUANTIFICATION, DYNAMIC ENHANCED VISUALIZATION, AND ADVANCED FUNCTIONAL ANALYSIS

DDR
DYNAMIC DIGITAL RADIOGRAPHY

Giving Shape to Ideas

DDR

DYNAMIC DIGITAL RADIOGRAPHY

Elevating X-ray Technology

INTRODUCING **WIRE-LESS DYNAMIC X-RAY TECHNOLOGY** FOR THE FIRST TIME

DDR is an innovative x-ray technology designed to capture a sequence of digital images at high-speed and low dose using wireless connection.

The resulting cine loop enables clinicians to observe the dynamic motion of anatomical structures over time, thereby enhancing diagnostic capabilities with functional information.

Combined with the advantages of portability and accessibly of mobile X-ray technology, this innovation has the potential to be a true game-changer in clinical practice.

DYNAMIC FUNCTIONAL IMAGING

A **REVOLUTIONARY** TECHNOLOGY

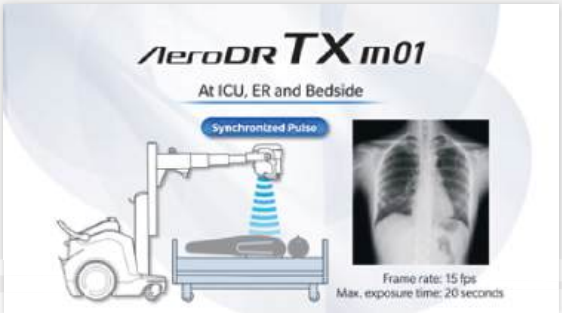
DDR is the only imaging technology that provides a view of anatomy in motion, with a large field of view and low radiation dose

This breakthrough system acquires low dose sequential digital images by continuously irradiating a pulsed X-ray and using a flat-panel digital detector.

Whole anatomical region can be observed in one exposure using 17x17" Flat Panel Detector*

*AeroDR3 1717HD2 or 1417HD2 is necessary for DDR

- **Most advanced medical imaging technologies like CT and MRI provide superb spatial resolution but not movement**
- **Ultrasound has a limited range and fluoroscopy cannot be reprocessed to highlight soft tissue**
- **Radiation exposure is much lower when compared with other imaging techniques like CT and Fluoroscopy**



ADDRESSING CRITICAL CHALLENGES IN INTENSIVE CARE UNITS AND EMERGENCY DEPARTMENTS WITH AERODR FEATURING INNOVATIVE DDR TECHNOLOGY

Responsive Monitoring of Quick changes in patient conditions
Patients in the ICU and ER often undergo sudden and unpredictable changes in their medical conditions. DDR technology serves as a powerful tool for accurately capturing these changes over time.

Enhanced Diagnostic Insights in Emergency Situations
In emergency scenarios where time is limited and conventional static x-rays may fall short, DDR emerges as a valuable solution, providing moving images with additional diagnostic information crucial for comprehensive patient evaluation.

Patient Safety Through Minimized Transportation
Transferring patients in critical conditions is a risk and may also expose them to potential infection. With DDR, diagnostic imaging can be conducted at the patient's bedside, significantly reducing the need for patient transportation enhancing patient safety.

Optimizing Workflow for Critical Patient Management
In critical conditions, time is crucial. Quick access to valuable diagnostic information is a need. DDR technology provides a flexible, simple, and cost-effective solution, eliminating the need for extensive patient or examination preparation. This optimization streamlines workflow, meeting the demands of effectively managing patients under critical conditions.

OPTIMIZING CLINICAL EFFICIENCY: DISCOVERING THE ADVANTAGES OF **DDR ACQUISITION ON AERODR TX**

Clinical value – DDR presents a 17" x 17" view of quantifiable and functional findings not detected with standard X-ray

Cost effective solution – Availability of DDR portable x-rays, provides a cost-effective solution that can substantially improve patient care

Efficient – Full exams are performed fast with simple workflow and are available directly on console

Accessibility – DDR capabilities with the new mobile AeroDR Tx enables **portable exam anytime and anywhere** in ICU/ER department and/or patient ward improving diagnostic capabilities

Patient-centric – DDR uses **low radiation**, does **not require contrast**, and can be performed in **multiple positions**

Effective – DDR technology address main challenges in Imaging today: Workflow, Accessibility, Cost and Diagnostic capabilities

*A mobile holder is required to acquire in seated or erect position.

UPGRADE OPTION

UNLOCK ADVANCED CAPABILITIES WITH THE DI-X1 DEDICATED SOFTWARES FOR DDR CHEST IMAGING POST-PROCESSING

DI-X1 (v.1.30) is the Dynamic Digital X-ray Workstation server with dedicated software that offers advanced analysis and quantification of anatomical movements, enhancing visualization with quantitative metrics and functional insights.

These applications offer invaluable insights, elevating diagnostic capabilities across various clinical fields such as ICU/ER, Respiratory Medicine, Thoracic Surgery, Cardiovascular.

For the first time, clinicians can access functional, quantitative, and advanced information about motion, revolutionizing the depth and precision of medical assessments.

PORTABILITY

Capture movement anytime, anywhere with AeroDR TX featuring DDR technology.

STREAMLINED WORKFLOW

Transforming diagnostics for rapid and effective patient care in critical conditions. Seamless integration into clinical routines with DDR immediate dynamic image visualization on the console.

Perform DDR examinations within minutes, requiring no patient preparation with the possibility to automatically send DDR images to the PACS for enhanced efficiency.

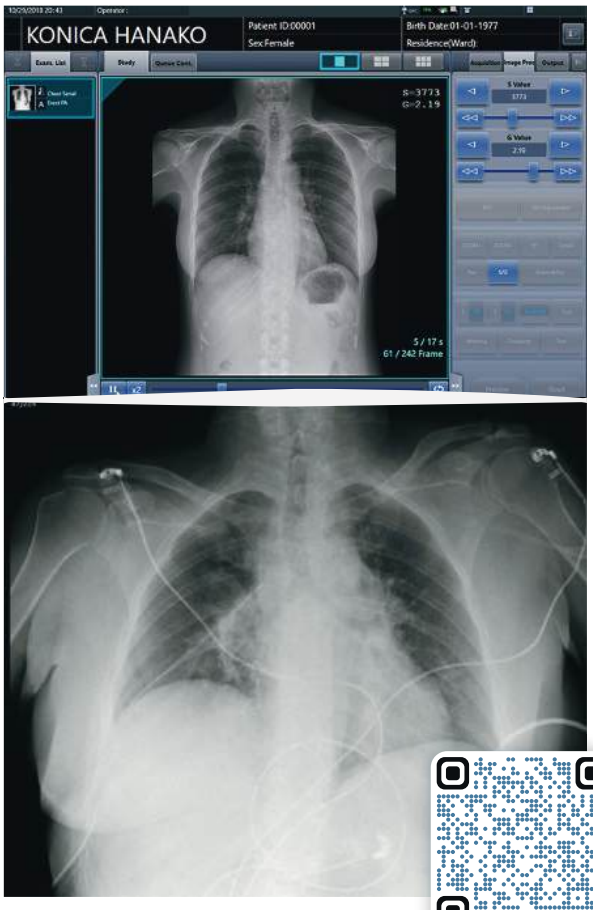
ELEVATED DIAGNOSTICS

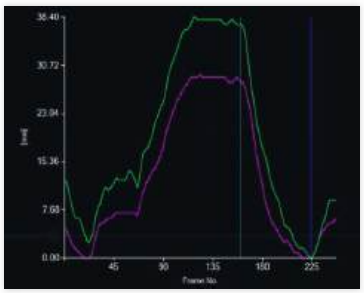
Motion capture enhances diagnostics, especially when standard X-rays fall short, offering the prospect of facilitating ICU/ER procedures at bedside, post-surgery follow-up, enhanced lesion visualization synchronized with thoracic movement and provide useful information for joint motion assessment.

FLEXIBILITY

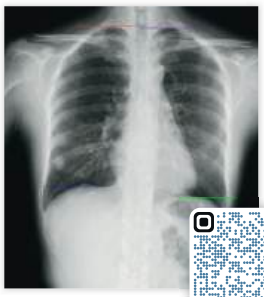
Konica Minolta introduces unique wireless DDR technology, enabling anatomical movement capture on a portable x-ray solution for the first time. This wireless versatility allows acquisition in every position, from bedside to seated or erect positions.*

Instantly visualizing moving images on the console proves particularly valuable for rapidly assessing patient conditions, especially in critical situations.





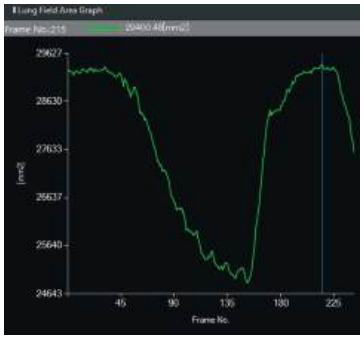
Excursion Graph



DM-Mode

ADVACED DDR SOFTWARES

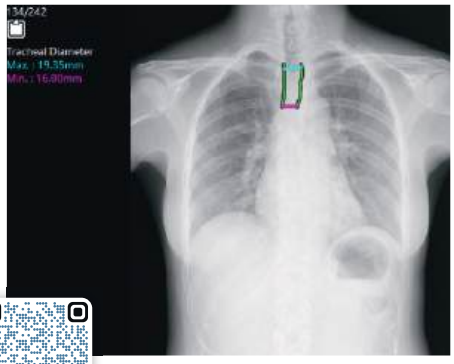
Anatomical motion quantification
The DI-X1 includes advanced quantification features, including the calculation of diaphragm motion and excursion, measurement of lung field area, tracheal diameter calculation, position tracking capabilities and the ability to compare quantitative data for follow-up lung exams.



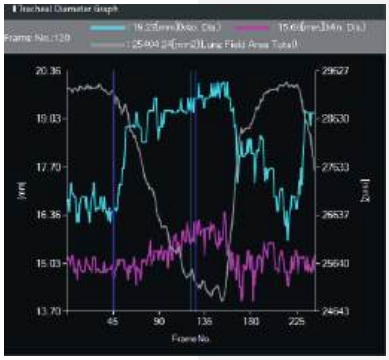
Lung Field Area Graph

Lung Field Area

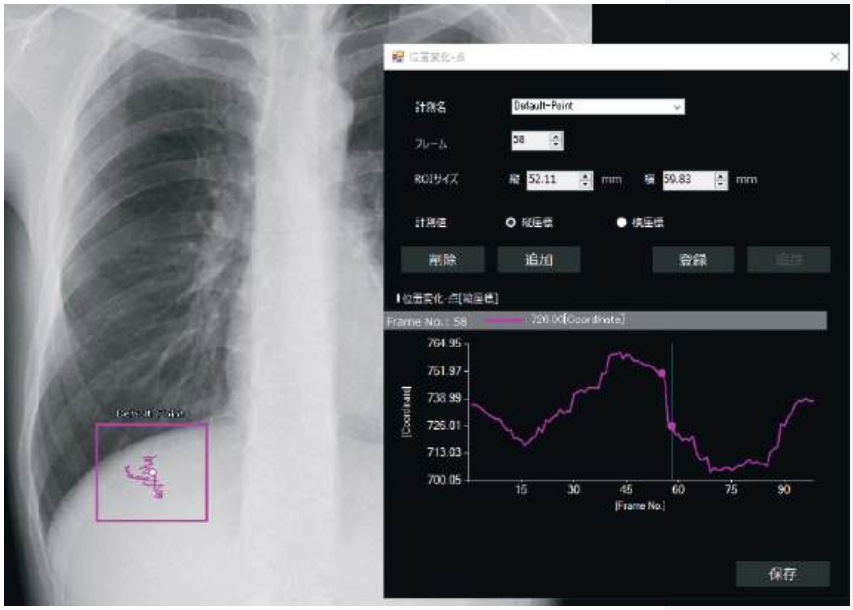
Motion Quantification with DDR can provide quantitative information related to the lung area and the diaphragm excursion that can be used for the **therapy evaluation of several respiratory diseases like cystic fibrosis, COPD**, etc. Moreover, it can identify disfunctions related to the physiological movement of the anatomical structure, like in case of **diaphragm palsy** or **tracheal narrowing in patients with obstructive ventilatory impairment.**



TD-Mode



Tracheal Diameter Graph



Position tracking tools

FitzMaurice TS, McCann C, Nazareth D, Walshaw MJ. P237 Dynamic chest radiography: a novel tool for the assessment of diaphragm palsy. Thorax. 2021;76(Suppl 1): A217-A217. doi: 10.1136/thorax-2020-BTSAbstracts.381

Hida T, Yamada Y, Ueyama M, et al. Decreased and slower diaphragmatic motion during forced breathing in severe COPD patients: Time-resolved quantitative analysis using dynamic chest radiography with a flat panel detector system. European Journal of Radiology. 2019; 112:28-36. doi: 10.1016/j. ejrad.2018.12.023

FitzMaurice TS, McCann C, Nazareth DS, McNamara PS, Walshaw MJ. Use of Dynamic Chest Radiography to Assess Treatment of Pulmonary Exacerbations in Cystic Fibrosis. Radiology. Published online March 15, 2022:212641. doi: 10.1148/radiol.212641

Watase S, Sonoda A, Matsutani N, et al. Evaluation of intrathoracic tracheal narrowing in patients with obstructive ventilatory impairment using dynamic chest radiography: A preliminary study. European Journal of Radiology. 2020;129. doi: 10.1016/j. ejrad.2020.109141

ENHANCED VISUALIZATION SOFTWARES FOR ACCURATE MOTION OBSERVATION

Bone suppression technology to minimize clavicle and rib interference in lung fields, revealing previously obscured structures uses.

BS-Mode

Frequency enhancement feature accentuates structure edges, significantly improving overall visibility and facilitating detailed motion observation.

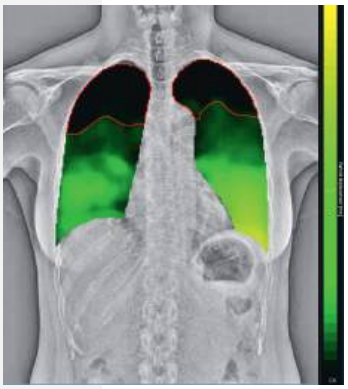
These advanced tools improve visualization of **lung lesions that may be obscured by bone.** Moreover, its ability to synchronize with motion not only improves the evaluation but also enables precise localization of these lesions. Furthermore, it enhances the visibility of soft tissue, vessels, and other structures within the lung field.

FE-Mode

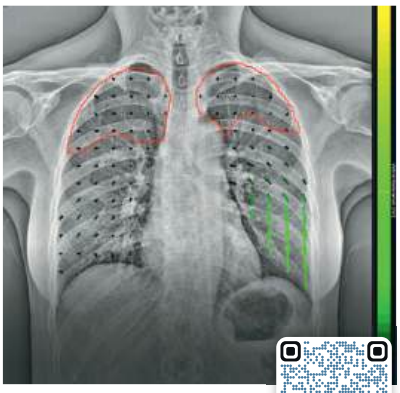
LUNG MOTION ASSESSMENT

Generation of the lung motion map and vector motion dynamic images not only showcases variations in movement in the vertical direction but also highlights areas where motion is lacking, providing a comprehensive visual representation for enhanced analysis.

DDR has valuable applications by **identifying adhesions and invasions** based on lack of lung tissue motion. Furthermore, DDR images are beneficial for **post-operative evaluations**, facilitating the assessment and follow-up of organ recovery, particularly in cases like the lung and diaphragm after procedures such as lung resection.

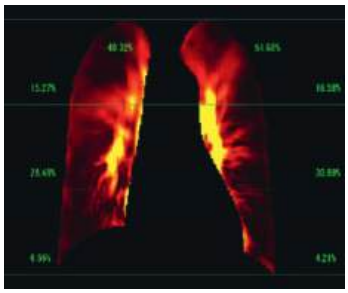


Summary Image



Vector Motion Dynamic Images

PH2-Mode: Dynamic Images



PH2-Mode: Summary Image

Watanabe T, Suzuki E, Yoshii N, et al. Preoperative detection of pleural adhesions using dynamic chest radiography: prospective analysis. Journal of Thoracic Disease. 2023;0(0). doi: 10.21037/jtd-22-1226

Hanaoka J, Yoden M, Hayashi K, et al. Dynamic perfusion digital radiography for predicting pulmonary function after lung cancer resection. World Journal of Surgical Oncology. 2021;19(1):43. doi: 10.1186/s12957-021-02158-w

FUNCTIONAL EVALUATION FOR ASSESTMENT OF LUNG PERFUSION

DDR, an advanced software utilizing signal changes associated with pulmonary circulation, provides functional information about lung perfusion **without the need for IV contrast or radiopharmaceuticals**. This eliminates contraindications and improves accessibility compared to methods such as scintigraphy. Thus, DDR might be a valuable methodology to identify perfusions defects correlated to Chronic Thromboembolic Pulmonary Hypertension (CTEPH), for example.

Yamasaki Y, Abe K, Kamitani T, et al. Efficacy of Dynamic Chest Radiography for Chronic Thromboembolic Pulmonary Hypertension. Radiology. Published online November 8, 2022:220908. doi: 10.1148/radiol.220908

Yamasaki, Y., Kamitani, T., Sagiyama, K. et al. Dynamic chest radiography for pulmonary vascular diseases: clinical applications and correlation with other imaging modalities. Jpn J Radiol (2023). https://doi.org/10.1007/s11604-023-01483-2

Yuzo Yamasaki, Shohei Moriyama, Ryoma Tatsumoto, Kohtaro Abe, Kousei Ishigami, Chronic thromboembolic pulmonary hypertension after acute pulmonary thromboembolism revealed by dynamic chest radiography, European Heart Journal - Cardiovascular Imaging, Volume 23, Issue 6, June 2022, Pages e264–e265, https://doi.org/10.1093/ehjci/jeac027

WHY KONICA MINOLTA

Today's healthcare systems encounter various and complex challenges that haven't been expected: COVID-19, aging population, increasing healthcare expenditures with declining reimbursement, and supply chain issues, etc. At Konica Minolta, we are driven by redefining and creating values for health-care providers that equips them to tackle those challenges, achieving diagnostic excellence.

With over 150 years of business history, our renowned technology company has revolutionized the industry of medical diagnostic imaging with advanced solutions that range from imaging equipment and ultrasound to medical IT systems. We are proud to be at the forefront of medical care transformation with our cutting-edge imaging technologies. Our solutions are designed to reduce the burden of patients while enhancing the accuracy of diagnostic procedures. Our comprehensive range of devices, systems and services enable digitization and networking within the medical imaging industry, offering a faster, more reliable, and more efficient diagnostic experience.

By providing comprehensive ICT services and solutions, we contribute to the realization of faster and more reliable diagnosis services and improved economic value through total cost of ownership, efficiencies, and increased productivity.

We will stay focused on end users and professional needs. **Together, we can make the world healthier.**

REV.NR. 1.0

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