

Utilization of a System with a Large Field of View FPD capable of both Fluoroscopy and Radiography for Wide Range of Examinations, from Gastrointestinal studies to Video Fluoroscopy (VF)



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■ A Wide-Ranging Contribution in Community Healthcare —from Emergency Medicine to Nursing Care

Our hospital is situated in the middle of Ichihara City, includes 214 beds and provides community healthcare following the concept of "prevention, treatment and nursing care." In recognition of many years of contribution towards ensuring and promoting measures for emergency medical services, in 2012 our hospital was given an award by the Minister of Health, Labour and Welfare for merit in emergency medical services. Construction of a new general health examination building is currently underway, therefore the hospital can continue to provide high quality community-focused healthcare.



■ Multi-purpose Utility in Screening, Barium Enema and VF

The hospital purchased a wide field of view FPD-equipped FLEXAVISION F3 (hereafter "F3") as an update to its existing I.I.-DR-type R/F system, based on the improvements in image quality and radiation exposure, and flexibility for use in other examinations of the F3 system. The F3 is equipped with a 14" × 17" FPD capable of high-quality distortion-free images, and is also capable of pulsed fluoroscopy that can reduce patient exposure significantly. Other substantial advantages of the F3 include the ability to raise and lower the table height, and to perform oblique projection.

The hospital currently uses the F3 in a diverse range of applications including health examinations, MDL, DDL, CF, ERCP, IVH port placement, cystography (DIP), ileus tube imaging, gastrostomy imaging, VF and repositioning in orthopedics.

The F3 is used for 120 MDL procedures per month and 15 CF procedures per month. The F3 is ideal for this hospital since it can perform many different types of examinations in a single system.

Although the F3 is placed in a small examination room, thanks to the compact design of the imaging table we are able to accommodate movement of equipment for endoscopic examinations without difficulty and also ensure ample workspace for staff and doctors.



A Variety of Examinations in Limited Space

■ Wide Field of View Improves Examination Efficiency

Examinations that require observation of a wide area such as gastrointestinal examinations of the large and small intestine, and VF examinations can be performed with ease using the 14" × 17" FPD. Using our previous I.I. system with its circular field of view, occasionally the contrast medium traveled outside the field of view and had to be searched for with the doctor, while the wider field of view of the 14" × 17" FPD images the entire area from the stomach to the large intestine and makes observation of contrast medium through the body very easy during contrast radiography examinations of the duodenum and small intestine. The high quantity of information present in the large field of view FPD also allows doctors to find unexpected diseases present in the patient.

■ High Density Resolution Makes Repeated Exposures Unnecessary

The high quality images produced by the F3 have reduced substantially barium halation and loss of shadow details, eliminating variations in image quality and the need for repeated exposures. Loss of shadow details often caused by overlapping of air in the lungs and stomach fundus used to require repeated exposures performed with different angles and approaches. This is no longer a problem, and with the F3 these examinations are completed with a single exposure. This has reduced not only examination times, but also the exposure dose and burden for patients.

■ Enabling VF Examinations to the patient even in a Wheelchair

The ability to extend the X-ray tube up to 1.5 meters is extremely useful during VF examinations of inpatients. We are very satisfied with the ability to utilize the wide field of view to perform stress-free examinations of mastication and swallowing while patients remains sitting in a wheelchair. Our previous X-ray tube could not be lowered sufficiently, and in order to image the entire area of interest required the patient to be raised towards the machine by having them sit on something. We currently perform 4 VF examinations per month, but this number will definitely rise in the future.

■ Advantage of Oblique Projection and Portrait/Landscape FPD Rotation

Blind areas that arise in enema examinations due to overlapping of the posterior and anterior intestines can be resolved using oblique projection, which improves our diagnostic capabilities. In addition, oblique projection reduces examination times and lowers patient burden when compared to moving the patient. Rotating the FPD into a landscape orientation also allows for proper imaging of the entire lung area in patients with a large body size.

■ Expanded system utility by a FPD capable of both fluoroscopy and radiography

The FPD can be used for both fluoroscopy and radiography, allowing plain radiography to be performed during a fluoroscopic examination. One situation where this is useful is confirmation after orthopedic repositioning. Previously, a general radiography system was used since the previous R/F system made image adjustments difficult. With the F3, radiography is performed after repositioning, and images are processed for easy viewing then saved. The R/F-capable FPD is also used for radiography in cases such as Y-view imaging of the shoulder, when the imaging angles used vary slightly depending on patient body size, posture and symptoms. Such examinations are completed with a single exposure utilizing low-exposure fluoroscopy to orientate the patient, and then performing radiography.

■ Comprehensive Dose Reduction by Pulsed Fluoroscopy and Added Filters

Pulsed fluoroscopy and added filters are utilized to reduce the exposure dose. We consider pulsed fluoroscopy at 10 pps sufficient to obtain stable images. At first, we felt uncomfortable with the movement but became accustomed to it very quickly, with pulsed fluoroscopy now posing no problem. We are considering a move to 7.5 pps depending on the examination. Patient awareness regarding exposure has been increasing as of late, and we wish to make efforts to reduce patient exposure such as by acquiring accreditation as a "medical exposure reduction facility."

■ Substantial Benefit to Patients of Adjustable Table Height

Without the ability to raise and lower table height hospital staff were previously forced to lift patients up onto the table. This was a burden for patients and hospital staff alike, and particularly problematic for patients with a compression fracture. The adjustable table on the F3 allows for smooth transfer both of patients carried on a stretcher and for patients capable of walking themselves who can lower the table for safe and stress-free access. The reduced patient burden is of substantial benefit. CF examinations were also previously performed using a high footstool, but can now be performed by lowering the table for convenience.

■ Bedside Controller Gives Peace of Mind to Patients

A bedside controller means a procedure can be explained to the patient while the operator is present at the bedside, which gives the patient peace of mind. This is particularly useful in allowing doctors to work at the bedside while next to the patient. The bedside controller is most utilized during enema examinations, but also used during CF, orthopedic repositioning and ERCP. Often the table slope must be in the Trendelenburg position during an enema examination, and particularly in elderly patients when there are problems with contrast medium flow the doctor has to perform the examination with the patient. Communication is simpler with the bedside controller than through a microphone. This reduces examination times and prevents the operator from missing the right timing for exposure, because the operator does not have to move between the control and examination rooms.

■ Planning to install Two More Units for even more Various Examinations

Because of the high image quality and ease-of-use of the F3, this hospital plans to purchase two further units for its new health examination building that is currently under construction. The improvement in image quality and reduction in exposure afforded by the FPD are considered a major benefit to patients. Of even greater importance, being able to control the system from the bedside controller while explaining the procedure to the patient will make the often disliked gastric examinations more agreeable and easy to bear.

While using one F3 system for all gastric examinations limited our uses of the machine, the purchase of two more units will allow us to utilize them in even more examinations in the future.



Health examination building currently under construction that will undertake preventative medical care for the local community. Two F3 systems will be installed here.

Advice to Doctors Considering Introducing This System

Because the F3 system is equipped with a portable FPD capable of both fluoroscopy and radiography, it can be utilized flexibly according to examination type and site. Because the FPD can be placed on the tabletop for plain radiography of limbs and fingers, it can be used in facilities that wish to perform plain radiography and fluoroscopy by a single system, or as a backup in facilities like our hospital that has only one general radiography system.