

Experiences Using the FLEXAVISION F3 Package



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1. Introduction

Ureshino Medical Center is located in the town of Ureshino, which is famous for Japanese tea and hot springs that promote beautiful skin, in the south-west corner of Saga Prefecture, near the border with Nagasaki Prefecture. Its forerunner, Ureshino Naval Hospital, was opened in 1937. Back then, it boasted the largest number of beds in Japan, which makes the Ureshino Medical Center a historically significant hospital. The naval hospital subsequently became the Ureshino National Hospital, and was subsequently re-organized in 2004 as the NHO Ureshino Medical Center due to a government push to convert national hospitals into independent administrative corporations. It is a regional core hospital for acute medical services, offering 424 beds and 21 clinical departments. The hospital is predicted to grow further when the West Kyushu Route of the Kyushu Shinkansen opens, providing a new station in Ureshino city.



Fig. 1 Appearance of the Ureshino Medical Center

2. Background to Introducing the System

We used to use an image intensifier type digital R/F table produced by another manufacturer in our endoscopy room. The number of endoscopies performed has been increasing year by year and, in 2011, we performed 150 endoscopic retrograde cholangiopancreatographies (ERCP), which is approximately three times as many as the previous

year. As the previous system was getting old (poor visibility made diagnosis and delicate treatments a struggle), we introduced the Shimadzu FLEXAVISION F3 package (hereinafter referred to as FLEXA F3) as a dedicated R/F table for endoscopy (digestive and respiratory systems).



Fig. 2 Scene at an Examination

3. Compact Design

When we first saw the unit, we were amazed how compact it was. At our medical center, we use the FLEXA F3 mainly for endoscopy, such as ERCP-related procedures, percutaneous transhepatic cholangiodrainage (PTCD), bronchoscopy, and gastrointestinal series. We carry the endoscope into the examination room when conducting an endoscopy procedure. The procedures normally require several doctors and three or four nurses. As the related items must be available for immediate access in the examination room, it is important to maintain enough free space for the staff members to move around. The FLEXA F3 is only about 150 cm deep, which makes the examination room feel about 30 cm larger. It is easy to approach the patient from the rear of the unit, which facilitates changing the patient's posture. The FLEXA F3 features a bedside operation console that allows performing basic operations such as table tilting and elevation, tabletop lateral motion, and longitudinal motion of imaging unit.

The range of table elevation is larger than before and allows the tabletop to be moved to the height of the stretcher when transferring a patient. The tabletop can be set at the ideal height for the doctor to easily approach the patient and maintain a comfortable posture when performing procedures.

4. High-Quality Fluoroscopic Images with Excellent Visibility

The FLEXA F3 features a 14" × 17" flat panel detector. It offers both radiographic and fluoroscopic images with superior contrast and sharpness to a conventional image intensifier. When performing endoscopic procedures under fluoroscopy, the success of the procedure is significantly affected by the visibility of the fluoroscopic images. When inserting a guidewire, catheter, or stent during contrast imaging of the bile duct and pancreatic duct, the location of the lesion is confirmed under fluoroscopy. Also, when inserting a treatment instrument, its position and direction need to be confirmed. Good visibility of the fluoroscopic images improves the efficiency of procedures and leads to reduced fluoroscopy time and exposure dose. It results in shorter times for the procedure and reduced burden on the patient.

5. Lower X-Ray Exposure Dose

The system includes various functions to achieve a lower X-ray exposure dose. Pulsed fluoroscopy is one such function that is extremely effective. At this hospital, we use 10 fps pulsed fluoroscopy for endoscopic procedures. The X-rays are emitted in pulses rather than continuously, which lowers the overall X-ray exposure dose. Generally, pulsed fluoroscopic images do not look as natural as those obtained by continuous fluoroscopy, but the pulsed fluoroscopic images presented by the FLEXA F3 are extremely smooth and natural.

The system also offers a BH filter to eliminate soft X-rays. As the soft X-rays, having no effect on the images, are not necessary, their elimination also reduces the X-ray exposure dose. This filter can be combined with pulsed fluoroscopy to effectively reduce the X-ray exposure dose. In addition, the X-ray grid can be easily removed to lower the exposure dose. However, we have no experience with this feature, as we use the FLEXA F3 as a dedicated system for endoscopy.

This medical center is a designated base facility for pediatric emergencies, where we frequently perform radiography on infants. In the future, we believe it may be possible to expand the application of that feature to pediatrics. Since the Great East

Case 1



Fig. 3 A 7 mm stone confirmed in the common bile duct. After endoscopic sphincterotomy (EST), the stone was grasped and removed by a basket catheter.

Case 2



Fig. 4 Biliary drainage treatment by tube stent placement in a case of obstructive jaundice due to distal bile duct cancer.

Japan Earthquake in 2011, the Japanese have become more concerned about radiation exposure. Therefore, we would like to see systems in the future that maintain adequate image quality while further reducing the X-ray exposure dose.

6. Summary

We have introduced the Shimadzu FLEXA F3, which is an extremely compact R/F table featuring a 14" × 17" flat panel detector. Its extremely high image quality has improved the efficiency of endoscopic procedures under fluoroscopy, leading to a lower exposure dose on patients and technologist alike. We intend to acquire quantitative data on the reductions in exposure dose. We have also determined that the shorter time required for endoscopic procedures alleviates the burden on the patient. In our medical center, we operate an

RIS manufactured by FUJIFILM Medical Co., Ltd. as the upstream system and a PACS manufactured by Yokogawa Electric Corporation as the downstream system. When the FLEXA F3 was introduced, we installed an RIS terminal in the endoscopy room to handle examination orders online. After the examination, the acquired images are automatically transferred to the PACS for immediate display on monitors. The online handling of examination orders eliminates the task of entering the patient's attribute information, such as ID number and name, before the examination, which helps enhance the reliability of the stored image data without the risk of input errors.

In the future, we would like to see systems with improved X-ray detector performance and digital image processing technologies that can maintain adequate image quality while further reducing the X-ray exposure dose.