

# RAD

## Easy-to-Operate MobileDaRt Evolution MX8



Shoichiro Nanjo, R.T.

Department of Radiology, TMG Asaka Medical Center  
**Shoichiro Nanjo**

### 1. Introduction

The TMG Asaka Medical Center (**Fig. 1**) is located in Asaka, a city in the southern part of Saitama Prefecture. The closest train stations are Kita-Asaka on the JR Musashino Line and Asakadai on the Tobu Tojo Line. Due to its proximity to downtown Tokyo, Asaka has prospered in recent years as a bedroom community of Tokyo.

Our hospital was originally established in April 1977 as Asakadai Central General Hospital, with 122 beds. After that, it was expanded to 236 beds in 1981 by building the new wing, and to 268 beds the following year. Then, in 1988, the hospital was renamed the Asakadai Central General Hospital. In addition, a group medical screening center was established in an attached facility in 1996 and the hospital was reopened after further expanding all buildings to a total of capacity of 326 beds (3832.96 m<sup>2</sup> floor area).

Forty years after the hospital was first established in this location, based on a hospital philosophy of being a “Hospital that Loves and Is Loved Based on Sophisticated Healthcare” and “Healthcare That Treats Patients Like Family,” and after two years of construction, the hospital was finally moved to the current site in January of this year (2018) and

renamed the TMG Asaka Medical Center (4887.05 m<sup>2</sup> floor area). The new facility has 446 beds and 805 employees (including 78 doctors, 385 nurses, and 195 medical support personnel), of which 33 are radiological technologists.

Even after relocating, we remain committed to implementing the hospital philosophy by daily practicing the following five things.

- (1) Provide healthcare in close cooperation with the local community and other medical institutions in the region.
- (2) Provide a 24-hour emergency care system through partnerships with other organizations.
- (3) Ensure the hospital can provide healthcare concurrently to multiple people.
- (4) Provide training to develop conscientiousness and improve technical skills as medical professionals.
- (5) Provide sophisticated healthcare by introducing state-of-the-art medical equipment.

### 2. Background for Introducing Equipment

Our hospital previously used computed radiography (CR) for our portable X-ray system, but as it was deteriorating with age, we introduced a flat panel detector (Canon) in 2014, which we used in combination with a Shimadzu MobileArt Evolution mobile X-ray system. At the previous Asakadai Central General Hospital, not much progress had been made toward converting systems to Information Technology. The only networking system in our hospital was the Hospital Information System (HIS). Without any RIS or PACS systems in the Department of Radiology, the department operated based on analogue film. Consequently, portable radiography at the time involved the following steps that combined digital and labor-intensive methods.

- (1) Confirm the X-ray acquisition order with the PC terminal in the radiology department.



**Fig.1** TMG Asaka Medical Center



Fig.2 Large 19-Inch Monitor



Fig.3 MobileDaRt Evolution MX8

- (2) Manually transfer the order information to the FPD management terminal.
- (3) Transport the FPD and FPD management terminal to the patient's ward or operating room and visually verify the patient ID wristband before starting radiography.
- (4) Return to the department to process and check images before outputting film.
- (5) If necessary, carry the film to the operating room to have it checked by the doctor.

Because we were using an FPD, we could view images on the FPD management terminal immediately after radiography, but the terminal screen size was only about ten inches, which was not big enough to display entire images. Some doctors expressed that the small screen size made it difficult to check images. To be able to confirm catheter tip and implant information, the doctors began demanding larger monitors in the operating theater or elsewhere. As we continued to use our portable radiography system, we began wondering if there was a way to operate the system without having to physically carry the FPD unit and laptop computer around. Therefore, to solve that situation, we reviewed the FPD-equipped portable X-ray systems available from respective manufacturers. That resulted in introducing the user-friendly MobileDaRt Evolution MX8 (Fig. 3), which features excellent maneuverability, quiet operation, and a large 19-inch monitor (Fig. 2) that improves examination efficiency by displaying images that doctors can check on-site where the radiography was performed.

### 3. Hospital Environment

As mentioned above, the TMG Asaka Medical Center was moved to the current site and opened as a new hospital on January 1 of this year.

We use Fujitsu HOPE/LifeMark-HX as HIS system, Fujifilm SYNAPSE as PACS system, Infocom iRAD-RS as RIS system, and Infocom image inspection system.

With the HIS system accessible wirelessly throughout the hospital, order information can be obtained and images transmitted at any time.

### 4. Workflow

The hospital uses the MobileDaRt Evolution MX8 system in operating rooms and the ICU, where workflow has been streamlined accordingly, as follows.

- (1) The doctor requests portable radiography via the HIS system.
- (2) After confirming the order in the RIS system, the MobileDaRt Evolution MX8 system is driven to the operating room or ICU, started up, and order information is obtained from the in-hospital network.
- (3) The patient ID is read from the patient's wristband and corresponding patient information is obtained from the modality worklist management (MWM) system.
- (4) Radiography is performed.
- (5) Images are checked and processed on the monitor equipped with the MobileDaRt Evolution MX8 and transmitted to the image inspection system.
- (6) Personnel examine the images on the image inspection system terminal in the Department of Radiology.
- (7) Images are transferred from the image inspection system terminal to the PACS system.

## 5. Experience Using the MobileDaRt Evolution MX8 System

### 5.1 Telescopic Column

The best feature of the system, after all, is the telescoping capability of the column on the portable X-ray system. That feature allows lowering the top of the column to a height of 127 cm and the top of the X-ray tube to 124 cm, which opens up the forward visibility during driving. That means that even very short technologists can safely drive the units (the technologist in the photo is 150 cm tall). It is also less intrusive for other patients in the area. Given the trend of increasing bed heights in the ICU, sometimes we cannot keep 100 cm SID or enough exposure field size before, but now that the focal point can be raised up to 202.5 cm, we no longer have such problems (Fig. 4).

### 5.2 Large Monitor

The screen on the laptop computer included with the FPD unit is so small that we did not use it to confirm clinical information. In contrast, the MobileDaRt Evolution MX8 includes a large 19-inch monitor that enables the catheter tip and implant locations to be confirmed on-site without checking

images on the PACS system. That has been popular with doctors, because it saves time and improves productivity (Fig. 5).

### 5.3 Positioning

Due to the smooth overall movements of the support mechanisms and drive system, with minimal vibration, the system can be moved very quietly. All the switches are extremely user-friendly to operate. For example, fine positioning adjustments are possible by parking the system relatively close to the bed, putting the FPD under the patient and then operating the switches on top of the collimator to move the system forward or backward. The exposure field lamp buttons and the exposure field aperture knobs on the front and back of the collimator also make it easy to position the exposure field (Fig. 6).

### 5.4 Storage Space

One surprisingly valuable feature is the many storage areas provided. The storage box can hold both full size and compact FPDs and also a grid for eliminating scattered radiation. The FPD storage slots have a locking function to prevent theft or mischief.



Fig.4 Visibility During Driving



Fig.5 Inside Operating Room After Surgery



Fig.6 Front (a) and Back (b) of Collimator  
Exposure field lamp buttons and exposure field aperture knobs are provided on both sides.



## 5.5 Options

Since the system has pin code login function, there is no need to carry a key and no worry about losing the key. It also eliminates the trouble of having to get the key to the specified storage location if the operator is called away to another location.

In addition, a wireless barcode reader can be used to verify patient ID and match patients with examination orders, even for patients with difficulty communicating, which simplifies the radiography preparation process and prevents examining the wrong patient or region.

Furthermore, a wireless exposure switch (**Fig. 7**) enables starting exposures from a distance to minimize exposure levels to technologists.

After acquiring images, the images can be checked, marks inserted, brightness or contrast adjusted, or other image processing instructions can be sent to the image inspection system terminal on-the-spot,



**Fig.7** Wireless Exposure Switch

in the same manner as for general radiography. That has significantly reduced the time needed for portable radiography from acquiring images to sending them to the image inspection system terminal. However, it also requires being careful to make sure both the FPD unit and the portable X-ray system are adequately charged.

So far, as of three months since we started using the system, we have experienced no errors or any other problems.

## 6. Summary

First we introduced a Canon mobile FPD unit in 2014 and then started using it in combination with an existing Shimadzu MobileArt Evolution system. Converting from CR technology meant we no longer had to carry the CR unit so many times and allowed us to check images on-the-spot, which has almost completely eliminated situations of having to go back to reacquire images after checking them back in the office. Consequently, our workflow efficiency has improved dramatically.

The doctors also like the system, because they can check the clinical images on the large monitor screen without leaving the patient.

The MobileDaRt Evolution MX8 we introduced this time helped solve many problems we were experiencing at our hospital. The attention to detail has resulted in a system that has performed as expected.