

Patient throughput changes when using the Medrad MR Injector and Syringe Loading Device - Experience at Providence Hospital, Columbia, SC

By Carla Haworth, RT (R) MR

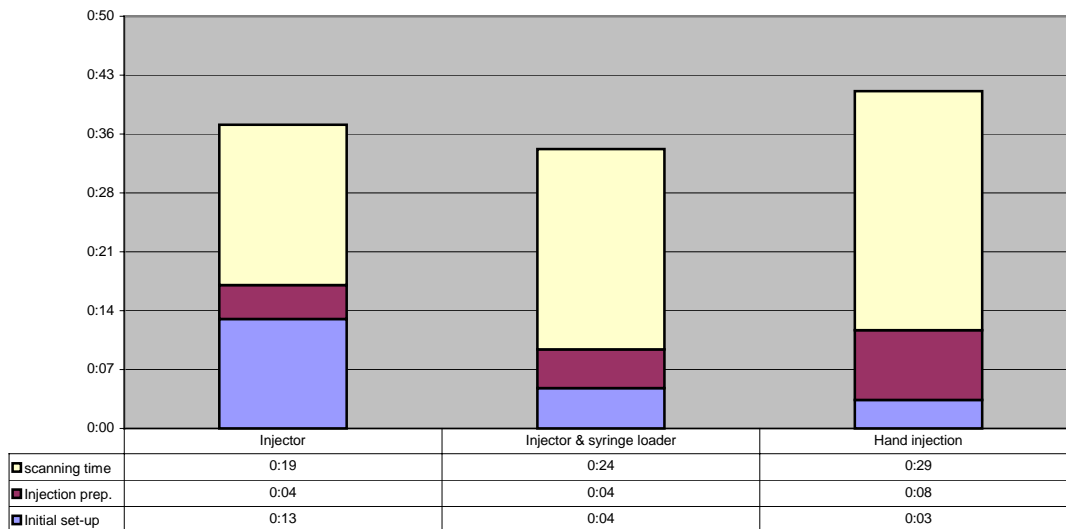
Purpose

Providence hospital began using a MR Syringe Loading Device that streamlines the procedure of loading both the contrast and saline syringes for use on the Medrad Spectris MR injector. This study describes the technologist experience, description of best practice techniques, and improvement in patient throughput resulting from the use of the accessory. The study, conducted from August through September 2001, documented the throughput of 35 patients receiving contrast injections.

Results:

Use of the Medrad MR Syringe Loading Device saved 9 minutes per power injected procedure. (Savings of set-up and injection preparation time.) Additionally, we found that with use of the syringe loader, power injected procedures saved 3 minutes compared to hand injection. We verified that the power injector savings compared with hand injection remained even on routine, typically hand injected, procedures such as routine brain studies.

Scan room time (Minutes) N= 35



In

Initial set-up: Time from patient entry to scan room until first scan started

Injection preparation: Time from last non-contrast scan until first contrast scan started

Although the sample set had variability in the scanning time, we found that the injection preparation and initial patient preparation times to be very consistent within each injection method evaluated. The differences in these times between each method are the best indicator for comparison.

Conclusion:

The MR Syringe Loading Device saves significant scan room time. At our institution we average 13 contrast enhanced procedures per week and the scan room time saved weekly is 1 hour and 57 minutes. Additionally we found power injection (with the MR Syringe Loader) to be faster than hand injection even for routine procedures.

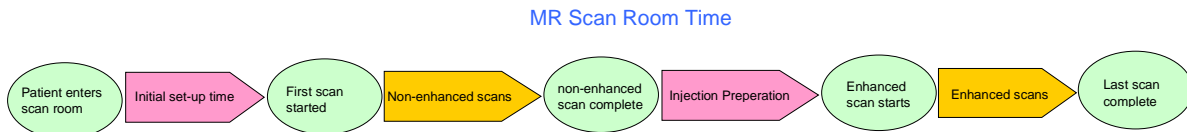
Power injection with the MR Syringe Loading Device should be used for all contrast enhanced procedures due to the increased efficiency. It is now standard practice at our institution.

Materials and methods:

During the period of August through September of 2001 data was collected to calculate the scan room time for contrast enhanced MR procedures using different methods of administration. Those methods were:

1. Power injection of all CE procedures using a Spectris MR Injector (Medrad Inc.)
2. In conjunction with power injection, use of an MR Syringe Loading Device (Medrad Inc.) enabling the Technologists to load contrast and saline into the injector syringes in the control room area.
3. Hand injection of routine brain and IAC's

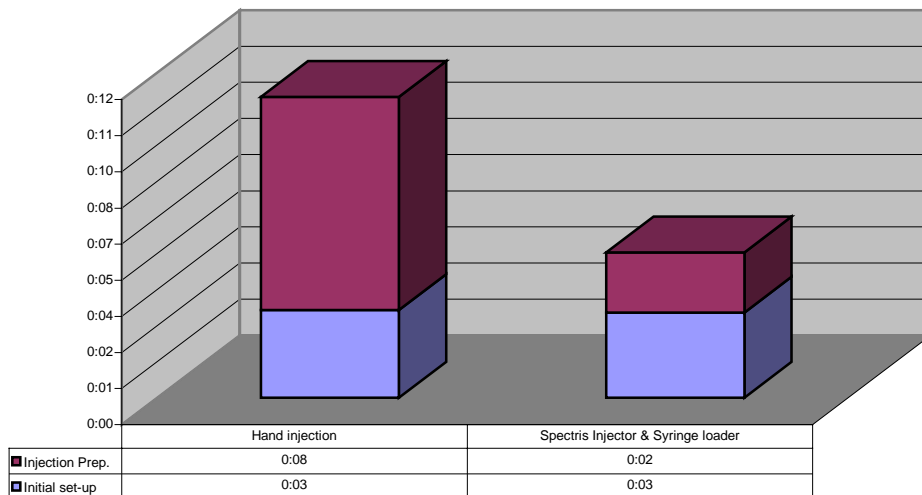
Prior to initiating the study we designed data collection instruments and verified that the technologist was familiar with the equipment, best practices for use, and data records could be maintained accurately. The data sheets were reviewed daily by the Chief Technologist (Carla Haworth, RTR) for accuracy and completeness.



Data was collected for the time: patients entered the scan room, first scan was started, non-enhanced scans completed, enhanced scans started, and the last scan completed. From this we calculated the set-up time and injection preparation time. It is these set-up and preparation times that differ with the method of contrast administration.

A total of 35 patients were studied. After a one week validation of the process and data collection instruments, we compared power injection with and without the use of the syringe loader for two consecutive weeks (n = 26, 13 syringe loader used, 13 no syringe loader used). During this time only one Technologist participated in the study. Subsequently we collected data for routine brain and IAC studies comparing power injection with use of the syringe loader to hand injection (n = 9, 4 hand injection, 5 power injection.) During this time several technologists were involved in the study.

**Routine Contrast Enhanced IAC's and Brain
Patient Preparation and injection time (Minutes) N = 9**



Discussion:

With increasing patient loads and limited Technologist resources, improving patient throughput is increasingly important and very challenging. Scan room time is a critical resource that needs to be optimized. With increasing demands for special procedures including, contrast use, it is important to evaluate procedures for best practices.

While power injection is required for certain MR procedures where timing or bolus reproducibility is critical, most enhanced MR procedures can be accomplished with hand injection. We identified that although hand injection is more familiar to Technologists and avoids the initial set-up and filling of the power injector, it requires additional time for administration.

When hand injecting the Technologist must enter the room, talk with and move the patient, give the injection, reposition the patient, and return to the console. Unfortunately we found time was also wasted as patients, anxious for the procedure to complete, often required additional effort to continue scanning. When using power injection the need to enter the room and disturb the patient is eliminated saving an average of 4 minutes per procedure by avoiding the need to re-enter the scan room for the injection. Use of the injector does involve additional set-up time, which reduces this advantage.

In August of 2001 Medrad Inc. provided us a MR Syringe Loading Device. It is a wall-mounted unit that enables the syringes to be filled with either contrast and saline in the control room. We found the device very easy to use and particularly liked the ability to have one hand free to hold the saline bag. The unit provided leverage so little effort was needed and filling was very rapid.

We found that by using the MR Syringe Loading Device, we could load the syringes in the control room while completing scans on the prior patient. Then preparation of the injector was simple, all that was necessary was to attach the syringes, purge lines, and connect to the patient. In our study we identified that the MR Syringe Loading Device saved 9 minutes compared to filling the syringes in the scan room. With the pre-loaded syringes the injector preparation only took an average of 1 minute more initial set-up time.

Acknowledgments:

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