

Preserving Radial Artery Approach Options:

The Pursuit of Patent Hemostasis in Hemostasis Management

The Sakakibara Heart Institute of Okayama



● Hospital summary

Juzenkai Medical Association The Sakakibara Heart Institute of Okayama

Specializes in cardiovascular and major vascular diseases.
Facilities include seven operating rooms and six cardiac catheterization rooms.
In 2022, treated 1002 cases of cardiac catheterization.

● Medical staff and postoperative care structure

Sachiko Takamatsu (Pictured third from right in front row)

Cardiac Cath Lab & Emergency Department Nurse Manager overseeing nursing staff.
Outpatient postoperative care (Coronary angiography): Approx 20 nurses including Takamatsu.
Inpatient postoperative care (Coronary angiography, PCI¹): Approx 100 nurses including ward nurses.

¹1 PCI: Percutaneous coronary intervention

Hemostasis Management for Patent Hemostasis: Protocols at Sakakibara Heart Institute

Since 2018, The Sakakibara Heart Institute has been revising their hemostasis management protocol for patients undergoing same-day coronary angiography via the radial artery approach, with the goal of achieving patent hemostasis - a technique that preserves blood vessel patency while achieving effective hemostasis.

Traditionally, hemostasis management begins by injecting 16ml of air into the TR Band™, followed by 2ml decompression once the patient has returned to their room, and 4ml decompression after another two hours. Finally, an hour later, the remaining 10ml is released to fully relieve the pressure. This protocol typically takes about three hours to complete. In the revised protocol, air is released to the maximum amount that does not cause bleeding, with intervals reduced to every 30 minutes (Fig. 1).

What prompted this change? What were the benefits and challenges of the new protocol? We spoke to Sachiko Takamatsu, Catheterization Lab Manager, to find out.

Traditional protocol

- Inject 16ml of air into the TR Band™.
- 2ml decompression after returning to room.
- 4ml decompression after 2 hours.
- Wait 1 hour and release remaining 10ml.



Revised protocol (Patent hemostasis-focused)

- Inject 16ml of air into the TR band™.
- After returning to room, air released to maximum amount that does not cause bleeding.
- Decompression continues at 30-minute intervals, releasing to the maximum amount that does not cause bleeding.
- Repeat till all air is released.

Fig.1 Changes in the protocol

Q What prompted the changes to the hemostasis management protocol?

A **The revision was driven by a suggestion from a diabetes specialist, and concerns about the lengthy hemostasis time.**

The revision was prompted in part by a diabetes specialist, who commented that they had difficulty detecting a pulse during examinations of outpatients with a history of coronary angiography, and suggested checking for radial artery occlusion (RAO). We then asked doctors to incorporate RAO checks during routine pulse examinations for patients with a history of coronary angiography visiting the outpatient clinic. I was also concerned that the traditional hemostasis protocol took too long. Same-day coronary angiography is common at

our hospital, and a long hemostasis time requires the nurse to be in attendance for longer. As the catheterization lab manager, my goal was to enhance nursing efficiency and use our human resources more effectively.

While considering these factors, I learned how Hakuhoukai Central Hospital had modified their hemostasis protocol to reduce the occurrence of RAO and shorten hemostasis time. I decided to implement their patent hemostasis-focused protocol at our institute.

Q What specific changes were made to the protocol?

A **Changes were made to the amount of air released during decompression and the decompression intervals.**

Two factors are considered crucial in hemostasis to reduce the risk of RAO and maintain blood flow in the radial artery: 1) apply the minimum necessary compression force, and 2) keep the compression time as short as possible. To adapt this to our new protocol, we took what we learned from the method used at Hakuhoukai Central Hospital and we revised the decompression volume and intervals.

In the previous protocol, decompression volume was standardized across all patients. Now we release pressure to the maximum limit that does not cause bleeding for each patient. For the decompression intervals, we've shifted from waiting two hours after the patient returned to their room before beginning, to decompressing every 30 minutes.

The puncture site is monitored through the transparent TR Band™ and air is slowly released. Decompression is stopped when the radial artery pulse is observed. Air is released as much as possible until the point where bleeding does not occur.



Fig.2 Hemostasis management to achieve patent hemostasis

Q Was there any resistance from nurses regarding releasing pressure to the point where bleeding does not occur?

A **There were some nurses who had concerns about the new protocol, but we provided careful guidance to give them confidence.**

For nurses concerned about the new protocol, I offered support and consistently reiterated how gradual release until pulse detection could achieve hemostasis with minimum compression force.

There were cases where despite no immediate bleeding after decompression, bleeding occurred when the patient moved their hand. Nurses were advised to stay with the patient after completing decompression until they could confirm that the

bleeding was controlled.

The key aspects of protocol implementation involved supporting nurses until they were comfortable with the procedure, and emphasizing careful observation for bleeding. As the track record for safely achieving hemostasis with the new protocol grew, we were able to alleviate anxieties associated with the protocol change.

Q How did the nurses react to the 30-minute decompression intervals?

A **There was some resistance initially, but the benefits to patient satisfaction were clear.**

While nurses already frequently visit and check on patients, the increase in decompression intervals initially faced some resistance. To help nurses adjust to the new 30-minute decompression intervals, we used timers.

Although some nurses initially viewed this as an increase in their workload, I firmly believe that shortening the

decompression intervals provides significant benefits due to the increase in patient satisfaction. Even when using the TR Band™, patients can feel considerable compression force when the air volume is high. A patent hemostasis-focused protocol, where decompression occurs sooner, was well-received.

Benefits

Q What were the clinical benefits of the change to a new hemostasis protocol?

A **The rate of RAO decreased, and hemostasis time was reduced.**

A study conducted at our hospital compared the rate of RAO and the hemostasis time before and after the protocol change in 2018. Published in 2022, the study demonstrated that in the group treated with the patent homeostasis-focused

protocol, the incidence of RAO was significantly lower than the group treated with the traditional protocol, and the average hemostasis time was reduced to about 1/3.¹⁾



Fig.3 Rate of RAO and the hemostasis time before and after the protocol change

Q What were the benefits for the nurses?

A **The shorter hemostasis time positively impacted work efficiency and mental health.**

The revised protocol's shorter hemostasis time allowed nurses to handle other tasks, and less time on continuous hemostasis management also gave nurses a mental break.

On a personal level, validating my hypothesis - that shortening the hemostasis time would free up nurses and optimize resources - was a significant accomplishment.

Q Can this protocol be implemented at facilities even if the nurses are not specialized in heart disease care?

A **Specialized knowledge will not be a barrier to adoption as long as the key points are followed.**

The safe adoption of this protocol hinges on three key points:

1. The slow release of pressure
2. Confirmation that bleeding has stopped after decompression
3. Developing a strategy for handling bleeding that occurs after decompression

If these points are adhered to, I believe other facilities can successfully implement this protocol.

POINT!



Q Your hospital currently uses both the traditional and the new protocol. How do you avoid confusion?

A **Our hospital's unique nursing staff structure, divided between outpatient and inpatient care, helps us manage different protocols without confusion.**

For outpatient care, my team is responsible for hemostasis management, and I was able to provide dedicated guidance to the nursing staff, facilitating a smooth transition to the new protocol.

However, the hemostasis management of inpatients is the responsibility of ward nurses. Instructing every ward nurse in the new protocol would be an enormous task, and modifying the clinical pathway would also be challenging. As such, we

chose to continue with the traditional protocol for inpatients.

With a clear division in outpatient and inpatient care among our nursing staff, we can have both the new and the traditional protocols existing without confusion. However, in a facility where the same nurses manage hemostasis for all patients, confusion may arise if the new protocol is not adopted universally.

Q Would you recommend implementing patent hemostasis even if it is limited to coronary angiography patients?

A **Yes, I would, due to the advantages of reducing RAO risk and workload.**

One of the risks associated with RAO is the compression time due to the hemostasis device. If we can prevent RAO by shortening the compression time, we can secure more future treatment options for the patients.

In recent years, distal radial artery approach has been advocated as another measure to reduce RAO risk. However,

this uses a different puncture site and requires adaption and specific devices which may have limited availability. Which is why patent hemostasis is a sensible choice as it enhances the results of the more widely used radial artery approach. Plus, the workload reduction from the shorter hemostasis time is a significant benefit.

Q What message do you have for nurses at other facilities?

A **I encourage nurses to consider how their hemostasis method can help safeguard the radial artery approach as an option for patients undergoing repeat catheter procedures.**

If the radial artery becomes occluded and the brachial artery approach is the only option, there could be drawbacks such as unsuccessful hemostasis or added patient discomfort during compression. A hemostasis management protocol that has a low risk of RAO can help preserve the radial artery and prevent transition to a brachial artery approach.

Although the number of patients undergoing repeat catheter procedures is falling, it's essential for nurses to consider how they can manage hemostasis in way that supports these patients, and ensures the radial artery approach is still a valid option.

PUSHING BOUNDARIES

