Chapter 1:

Patient selection
Patient preparation
Specific hardware
Puncture
Haemostasis
Patient selection criteria

Demographic criteria:
  Age
  Weight and height
  Gender

Risk factor: hypertension

Clinical status

Radial pulse
Exclusion criteria

Non-palpable or weak radial pulse
Non-patent collaterals of palmar arch
Chronic renal failure with A-V fistula
Raynaud’s syndrome
Cardiogenic shock
Learning steps and competency levels

- Diagnostic procedures in <70 y.o patients with good radial pulse
  - Number of cases: 1

- Planned PCI in stable patients with type A or B lesions
  - Number of cases: 2

- Diagnostic for all stable patients (elderly, bypass graft, short stature)
  - Number of cases: 2

- PCI for all-comers stable patients
  - Number of cases: 3

- STEMI patients
  - Number of cases: 3

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From simple to complex patients according to: age, stature, gender, HTA, clinical status, radial pulse

<table>
<thead>
<tr>
<th>Exclusion criteria</th>
<th>Relative exclusion</th>
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</thead>
<tbody>
<tr>
<td>Poor weak radial pulse</td>
<td>Women with short stature</td>
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<tr>
<td>Non-patent hand collateral arteries</td>
<td>Acute coronary syndrome or cardiogenic shock</td>
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<tr>
<td>Raynaud’s syndrome</td>
<td>Old patient with HTA</td>
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<tr>
<td>Known severe innominate subclavian artery disease</td>
<td>Chronic renal failure patients with fistula</td>
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<tr>
<td></td>
<td>Complex PCI</td>
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</tbody>
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Barbeau test results

<table>
<thead>
<tr>
<th>Type</th>
<th>Start</th>
<th>After 2 min.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>B</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>C</td>
<td>–</td>
<td>+</td>
</tr>
<tr>
<td>D</td>
<td>–</td>
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Patient preparation

Before the cathlab
Patient’s information
Premedication: hydroxyzine dichlorhydrate
EMLA® cream

In the cathlab
Allen test, oxymetry
Local anaesthesia
Anaesthesia? (Remifentanyl)
<table>
<thead>
<tr>
<th>Right RA</th>
<th>Left RA</th>
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</thead>
<tbody>
<tr>
<td>Physician comfort</td>
<td>Less easy for the physician</td>
</tr>
<tr>
<td>X-ray exposure</td>
<td>More X-ray exposure</td>
</tr>
<tr>
<td>One catheter for both coronary arteries</td>
<td>2 catheters</td>
</tr>
<tr>
<td></td>
<td>Less sub-clavian loops</td>
</tr>
<tr>
<td></td>
<td>Easier ostia cannulation</td>
</tr>
<tr>
<td>RIMA</td>
<td>LIMA</td>
</tr>
</tbody>
</table>
To check palmar arch: Barbeau’s test only

EMLA® cream and subcutaneous lidocaine

Left radial more useful, but less comfortable

Fixed wrist with hyperextension

Puncture site: 2-3cm above flexor crease
Puncture kit with venous canula
6.5Fr / 0.058” SheathLess

4Fr Sheath Introducer

6.5Fr

5Fr Sheath Introducer

O.D. 2.00mm

7.5Fr

5Fr Sheath Introducer

O.D. 2.29mm

O.D. 2.29mm

O.D. 2.49mm

7.5Fr / 0.070” SheathLess

6Fr Sheath Introducer

O.D. 2.62mm

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Another solution: Slender® technique

6Fr Sheath → Down Sizing → 6Fr GSS → Equivalent Diameter → 5Fr Sheath

5-in-4
6-in-5
7-in-6
Slender technology:
- Allows 1Fr size reduction in outer diameter
- Maintains larger inner lumen diameter
- Reduce the need to upsize to a larger sheath
Specific hardware - summary

- Low-profile sheath with venous cannula or bare-metal needle
- Slender® hydro coating sheath
- Standard and hydrophilic 0.035” wire
- Sheathless catheter
- Closure device
Ideal puncture site

- Ideal site
- Flexor crease
- 2-3 cm
Puncture techniques
A good flow, but the wire doesn’t advance

Never force

Perform a J to the wire or use a J specific wire

Needle rotation

Cannulation with venous needle and inject contrast to understand

New puncture higher
Management of the radial spasm

Injection of Verapamil and nitrates

Adequate sedation

Induction of reactive hyperaemia
Cocktail

**Vasodilator**
- Verapamil: 2.5 mg
- Nitro: 100 μg
- Diltiazem: 5 mg

**UHF**
- Diagnostic: 50 UI/kg
- PCI: 70-100 UI/kg
Local anaesthesiology with subcutaneous needle

Puncture with an 30-45° angle

Transfixant or not, doesn’t matter

Advance wire only if a good flow

Use a cocktail (vasodilator and heparin)
TR Band
Radial artery compression device

COMPRESSION

SELECTIVE to allow venous blood return and preserve patency.

TRANSPARENT for visual control of puncture site.

COMFORTABLE and kind to patients, to enable early ambulation.
Optimal use of TR Band device

Right position of the device (green marker 1cm above skin puncture)

15cc air inflation

Decrease air pressure until bleeding

Inflate again 1cc or 2cc air
HOW TO USE THE TR BAND? (1-2)

1. After procedure, **WITHDRAW** the sheath by 2-3cm.

2. **ALIGN** the green marker 0.5-1cm up to the skin puncture site and fix the belt on the wrist with the adjustable fastener. Make sure the fastener is stable and note slanted.
HOW TO USE THE TR BAND? (3)

3. To **INFLATE** the compression balloon, inject 15ml of air using the TR Band inflator, which is included in the kit.

After injection, quickly remove the syringe and be sure to control the plunger in order to avoid air being forced back into the syringe.
HOW TO USE THE TR BAND? (4)

4. **REMOVE** the sheath and confirm that there is no bleeding from the puncture site.

5. **DECREASE** air volume ml by ml until bleeding appears and inflate again 1 or 2ml (patent haemostasis technique). If bleeding is observed, inject more air (not exceeding a total of 18ml) until it stops.
5. **CHECK** the progress of haemostasis and decrease gradually over the time the air pressure of the balloon with Band inflator until to remove the system (2 hours after coronary angiogram and 3 hours after PCI).

If patient complains of pain: confirm there is no bleeding and remove an appropriate volume of air with the TR Band inflator.

If bleeding occurs: inject more air until it stops (not exceeding a total of 18ml).

Last step but essential to prevent radial artery occlusion

Several devices

Achieve radial patent flow haemostasis without bleeding

As short as possible
Potential factors of radial occlusion

Sheath profile

Ratio artery / sheath

Anticoagulation

Compression:
  Duration
  Complete occlusive compression