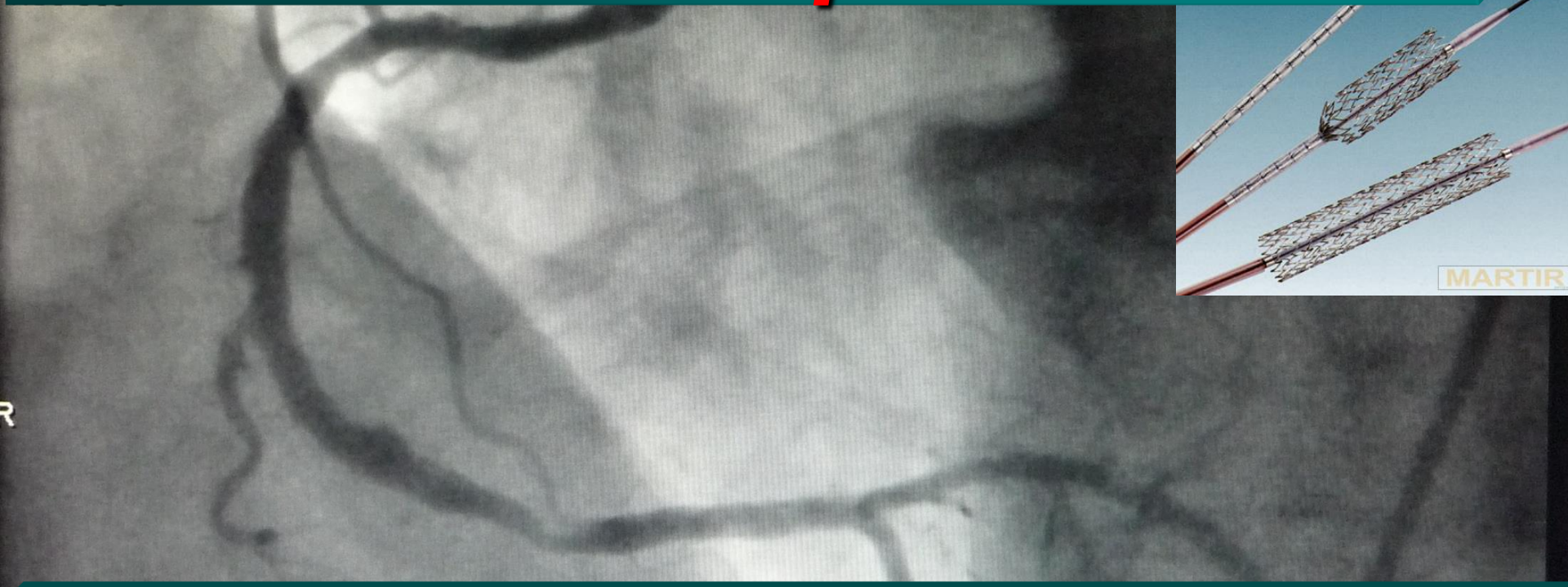
Basic recommendations for Interventional procedures



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National Program of Radiation Protection of Patients

Joint Commission of Profesional Societies using Radiation in Medicine

- Sociedad Argentina de Radiología (SAR)
- Asociación Argentina de Biología y Medicina Nuclear
- Sociedad Argentina de Terapia Radiante Oncológica
- Asociación Médica Argentina (AMA)
- Sociedad Argentina de Pediatría (SAP)
- Soc. Arg. de Medicina y Cirugía de Trauma (SAMCT)
- Col. Arg. de Cardioangiólogos Intervencionistas (CACI)
- Colegio Argentino de Cirugía Cardiovascular (CACCV)
- Sociedad Latino Americana de Radiología Pediátrica
- Sociedad Argentina de Física Médica (SAFIM)
- Sociedad Argentina de Radioprotección (SAR)

Advisory Committee (Physical medical and health physics')

Programme of PRP "Basic Objectives"

1. Justification: The study is performed only when imaging studies are needed. (Referral Guide)
2. Optimization of practice: Studies be carried to the doses received by the patient are ALARA
3. Prevention of risks: To avoid occurrence of accidents and serious injuries in interventional procedures establishing quality systems
4. Training and Education: Including the prescribing physician and whole team of Intervent. Cardiology
5. Dissemination of PRP criteria to the entire medical community and the public
6. Regulation and supervision: To stregthen authorities for update regulations.

1012 driving force: Reference Levels + Mamo

BSS-115
New version

Médical
Exposure
Req. 34 al 42

IAEA Safety Standards

for protecting people and the environment

Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards

INTERIM EDITION

General Safety Requirements Part 3

No. GSR Part 3 (Interim)

IAEA
International Atomic Energy Agency

The Alliance for Radiation Safety in Pediatric Imaging

UNA IMAGEN CUIDADOSA PARA PROTEGER A LOS CHICOS

Gently:

Ligeramente, con tacto, dulcemente, con delicadeza

Activities of the programme are split in the different areas of diagnosis and therapie

- Radiodiagnosis: RX, Mamografy, TC, Densitometry, Odontológy
- Nuclear Medicine special PET-TC
- Radiotherapy (Braqui, Teletherapy)
- Interventional Radiology and Cardiology
- Pediatry as a sub-system of each speciality including the pregnant women

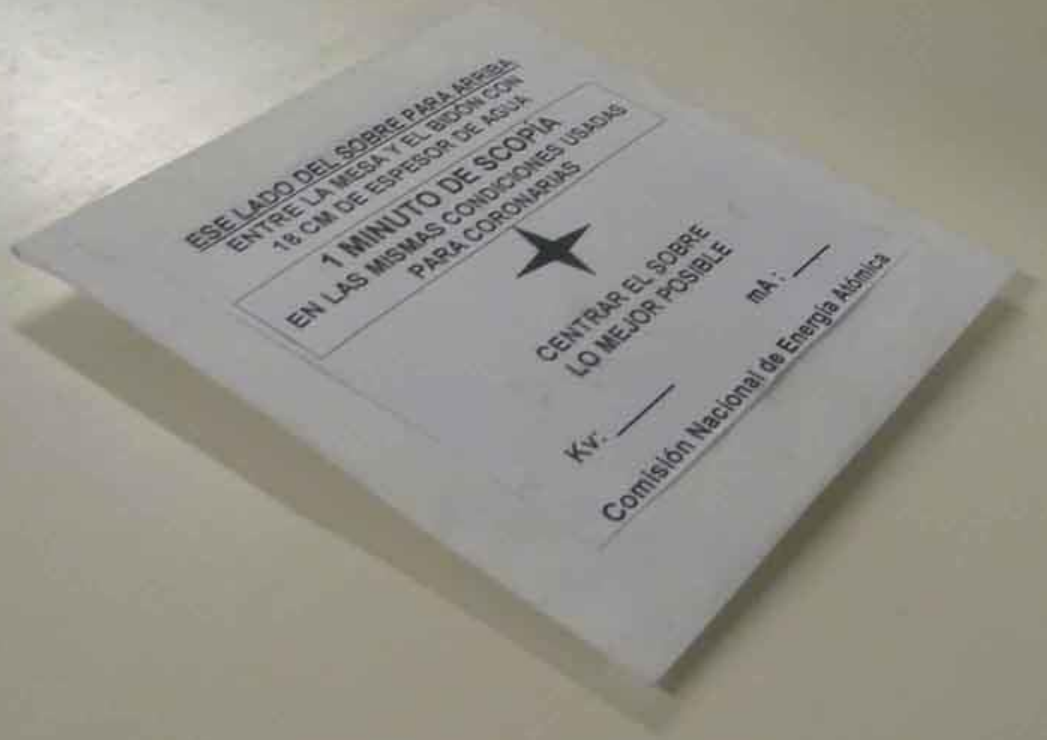
Interventional Cardiology

Colegio Argentino de Cardioangiólogos Intervencionistas (CACI)

Plan: 4 areas of work

- Staff training (guide review by medical staff)
- Equipment control (postal dosimetry)
- Create a Radiological Protection service (Hospital Radiation Protection Commision)
- Patients Follow-up in case of over-irradiation.

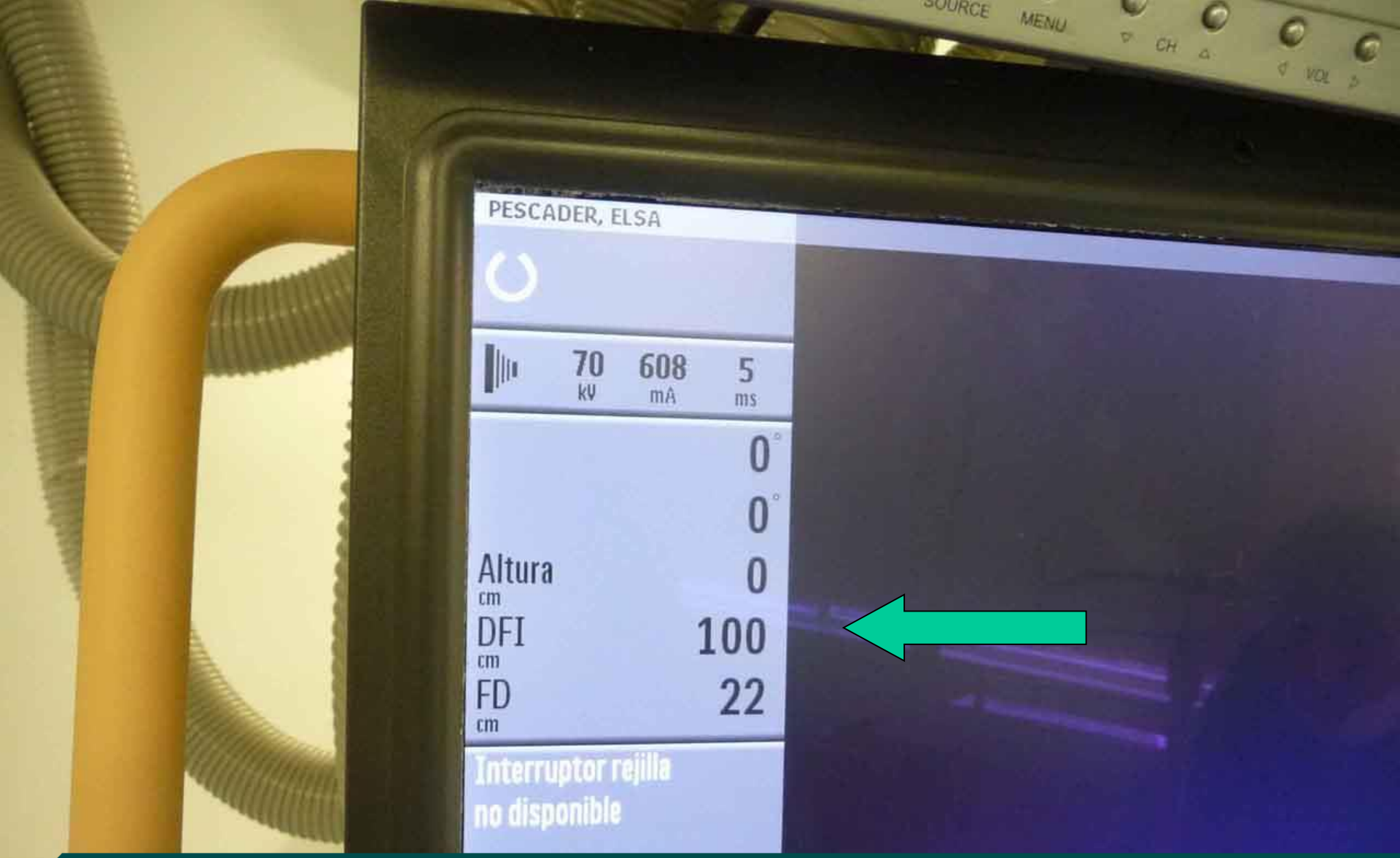
El sobre tiene en su interior los dosímetros



Se retira la colchoneta de la mesa y se coloca el primer sobre con dosímetros en el centro para hacer la primera medición

Cuando todo está listo se pone el Bidón con agua arriba del sobre (todo bien centrado)

El bidón tiene 18 cm de espesor de agua



En algunos equipos se puede leer en el monitor la distancia tubo/detector (100 cm)

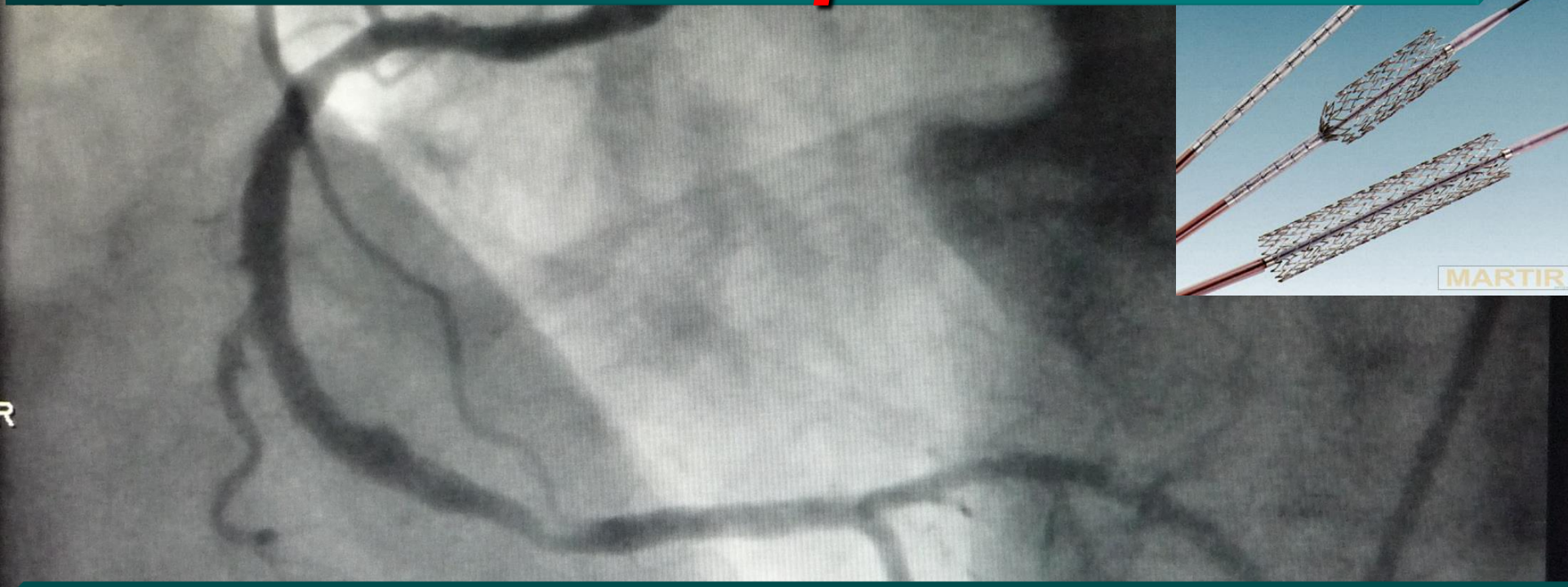
Se miden todas las distancias

One minute irradiation in fluroscopy

Change the TLD dosimeter

30 seconds irradiation in adquisition

Basic recommendations for Interventional procedures



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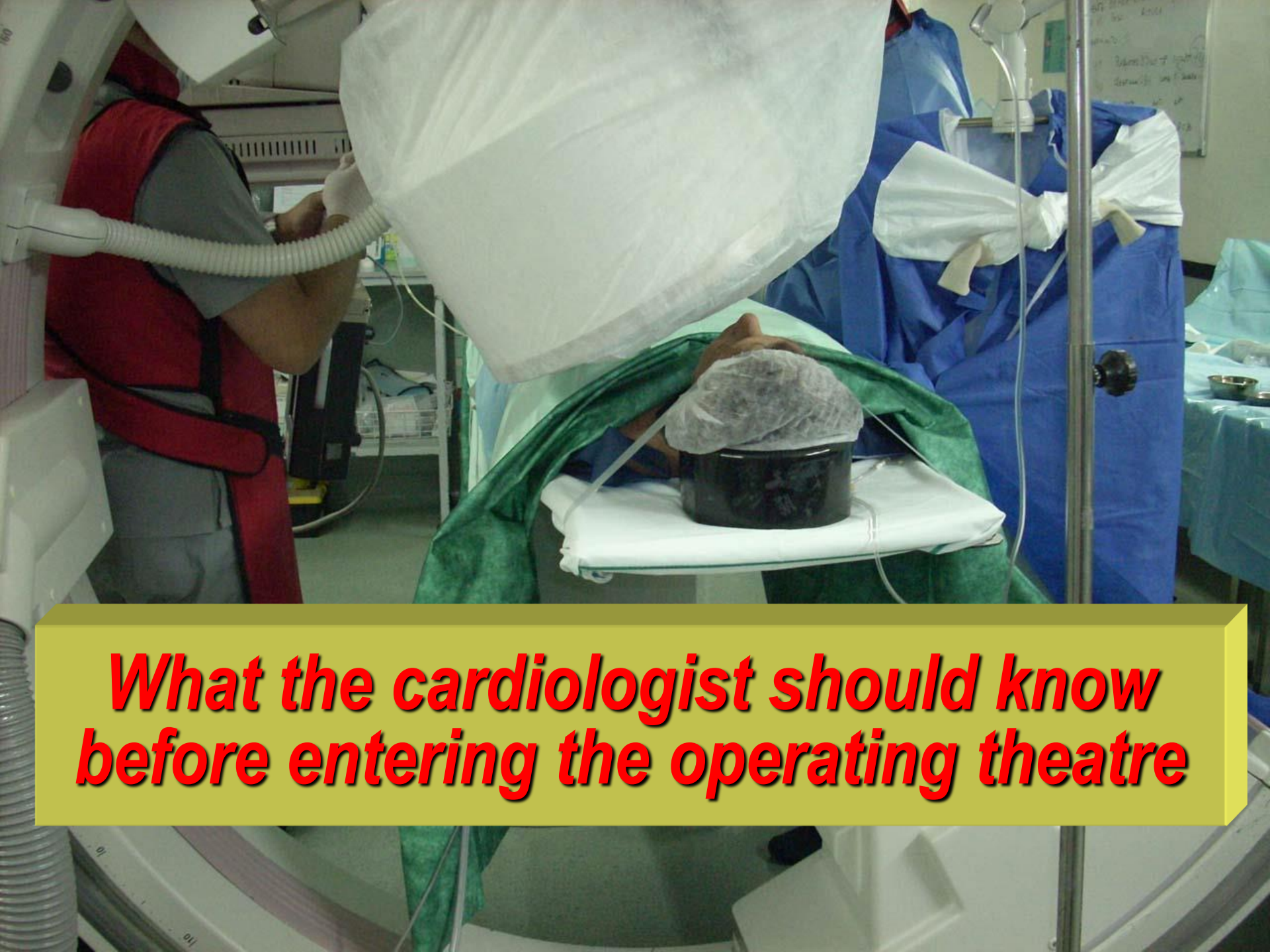
Basic recommendations for Interventional procedures

Recommendations in 6 steps

- The interventional physician before go into the operating theatre must KNOW:
- The interventional physician, before starting a film sequence MUST verify that: (Check-list)
- The interventional physician during a movie sequence MUST apply the following criteria:
- An assistant at the end of the intervention MUST record at least, the following information
- Responsibilities of the Hospital Management
- Responsabilities of the Regulatory body



What the cardiologist should know before entering the operating theatre

- *What is the dose rate the patient can get in fluoroscopy and movie*
- *How the doses vary with different projections and special oblique positions.*
- *How the dose varies depending on the thickness of the patient, particularly in obese*
- *How do they compare doses with some "Reference Levels" applicable.*
- *The threshold values for deterministic effects in the patient's skin.*
- *What to do when surgery is prolonged by difficulties or complications.*

Efecto Determinístico	Dosis umbral (Gy)	Tiempo de inicio efecto	Min Scopía (20 mGy/min	Min CINE (200 mGy/min)
Eritema transiente temporal	2	**2 - 24 hs**	100 min	10 min
Eritema, reacción permanente	6	**≈ 1.5** semanas	5 hs	30 min
Depilación temporaria	3	**≈ 3** semanas	3 hs	15 min
Depilación permanente	7	**≈ 3** semanas	3½ hs	30 min
Descamación seca (y telangiectasias)	14	**≈ 4** semanas	12 hs	1.2 hs
Descamación húmeda	18	**≈ 4** semanas	15 hs	1.5 hs
Necrosis dérmica tardía	> 12	**>52** semanas	12 hs	1.2 hs

Dosis Efectiva para diversas intervenciones
Fuente: Fred Mettler et Al. 2008 Journal of Radiology

E S T U D I O	Dosis Efectiva promedio (mSv)	Valores extremos en la Bibliografía (mSv)
Angiografía de cuello y/o cabeza	5	0.8 - 19.6
Angiografía coronaria	7	2.0 - 15.8
PTCA y/o colocación de stent	15	6.9 - 57
Angio toráxica de arteria pulmonar o aorta	5	4.1 - 9
Angio abdominal o aortografía	12	4.0 - 48
Embolización de la vena pélvica	60	44 - 78

The interventional physician, before starting a film sequence MUST verify that: (check-list)

- All staff has worn all the protection devices.
- The image intensifier is as close as possible.
- The field is focused and the iso-centric is at the point of greatest interest
- The X ray tube is as far as possible from patient skin
- The collimation system fits the area of interest.
- In the field there is not very different densities that are not compensated (the wedge filter is available)
- The patient's arms do not stand in the primary beam
- If it is a young patient have been protected sensitive parts which are not of interest.
- No people unnecessarily close of the X ray arm, etc

The main technician can help in looking around

The interventional physician during a movie sequence MUST apply the following criteria

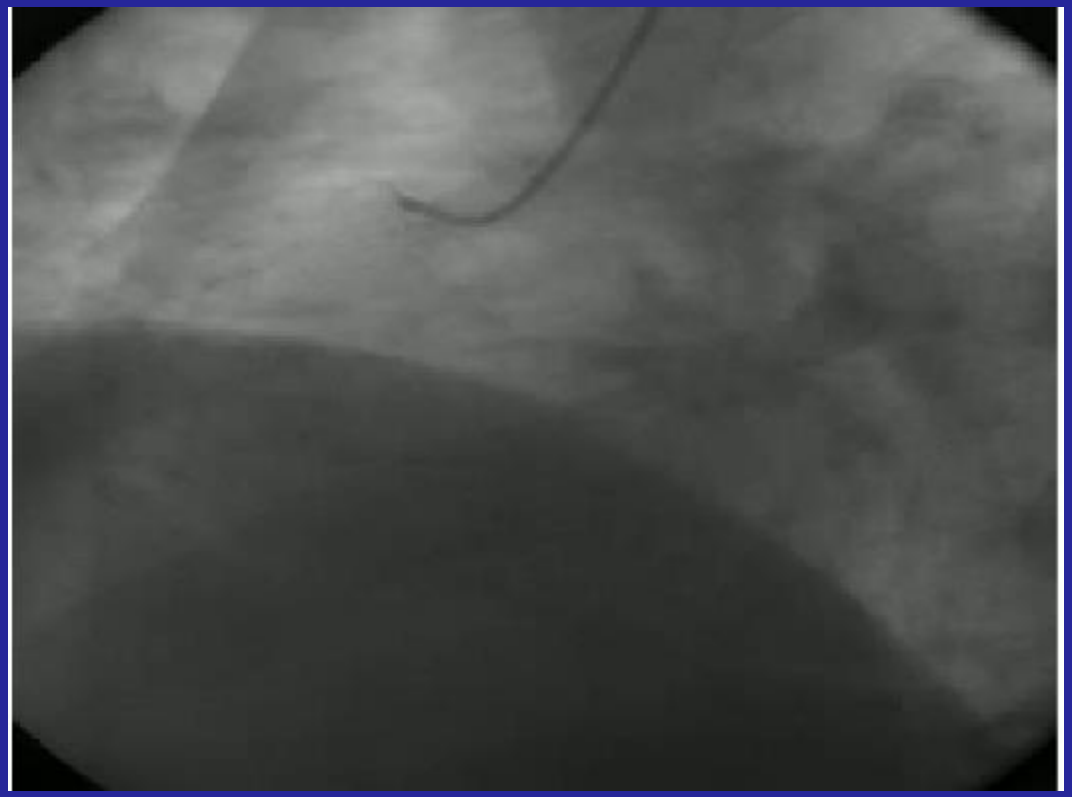
- Start the acquisition of images only when the field is right focused and well defined
- Release the pedal when not watching the screen or when you can work with the frozen image.
- Do not use movie when fluoroscopy gives sufficient image quality. Using pulsed fluoro when available.
- Use only the appropriate magnification the object of interest, and no more.
- Avoid if possible very long film sequences freezing the image.
- Release the pedal when the contrast has already reached the maximum value and begins to wash.
- Always know what dose the patient is receiving.

Practical examples of some cases that determine an unnecessary increase in dose:

- *Take very long sequences.*
- *Use movies when not required.*
- *Center the field incorrectly.*
- *Using inhomogeneous density fields.*
- *Wrong position of Image Intensifier*
- *Expose areas that can be protected*
- *Do not collimate enough*

Aquí se toma una larga secuencia de cine….pero, Una vez que el contraste ocupa todo el sector de interés, el resto no agrega información y aumenta la dosis en el paciente y en el médico…

Si el médico aplica este criterio en toda la intervención está duplicando los riesgos..!!!

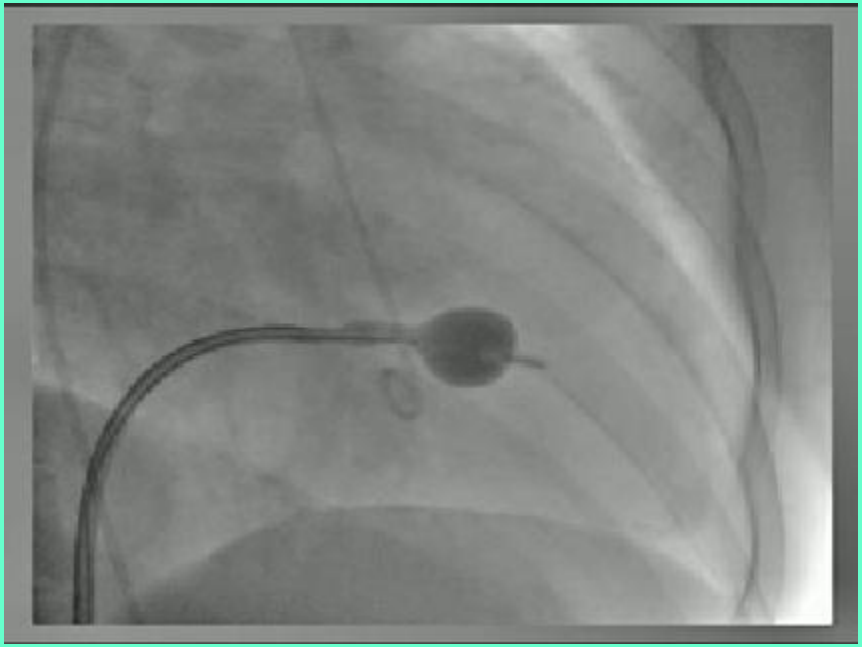


Angio de coronaria derecha

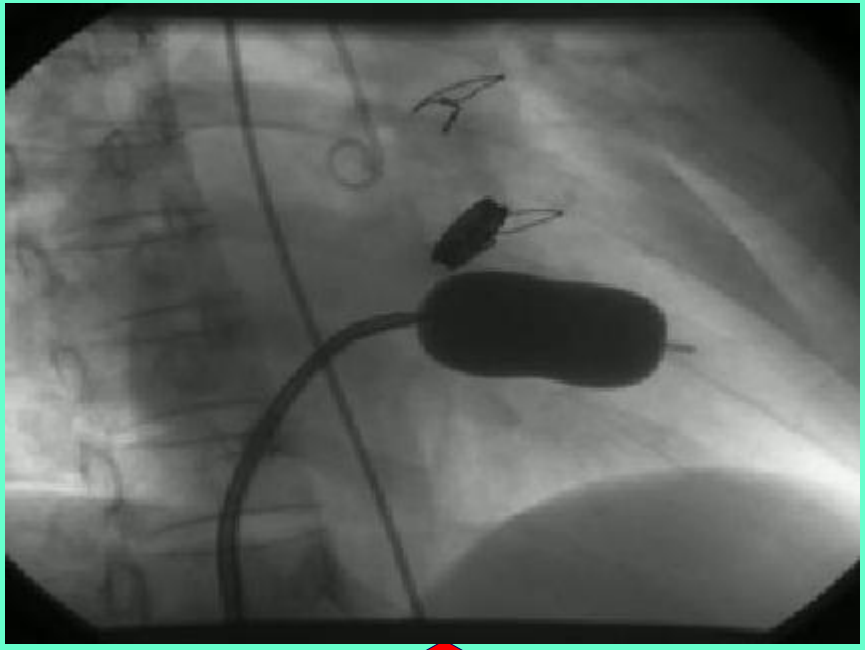
[video clip]

Usamos Scopía de baja o CINE..??

Scopía de baja

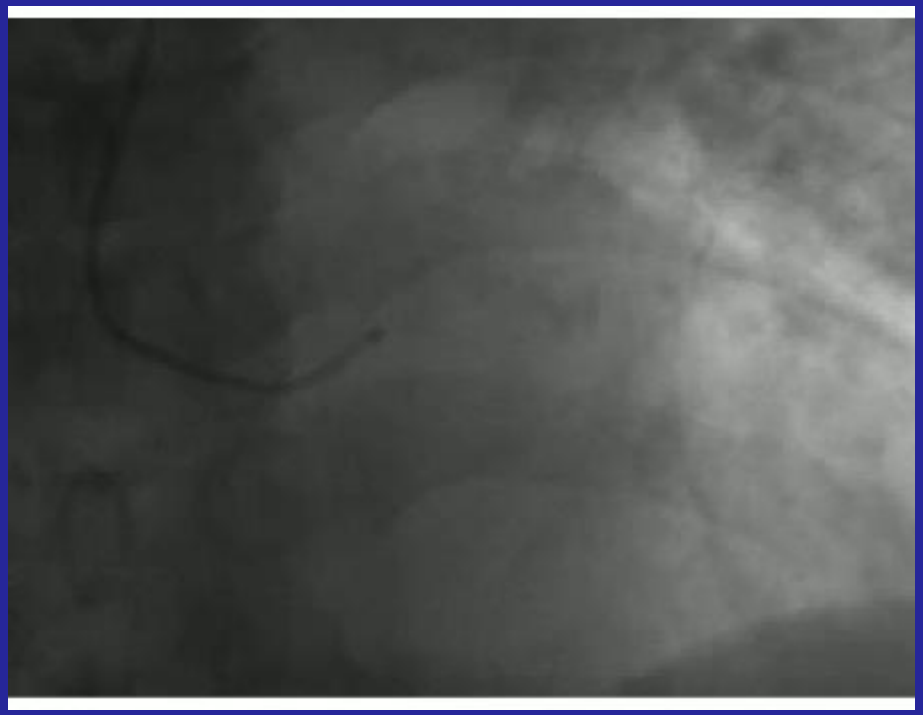


cine



Aquí se ve mejor…
pero hace falta.?

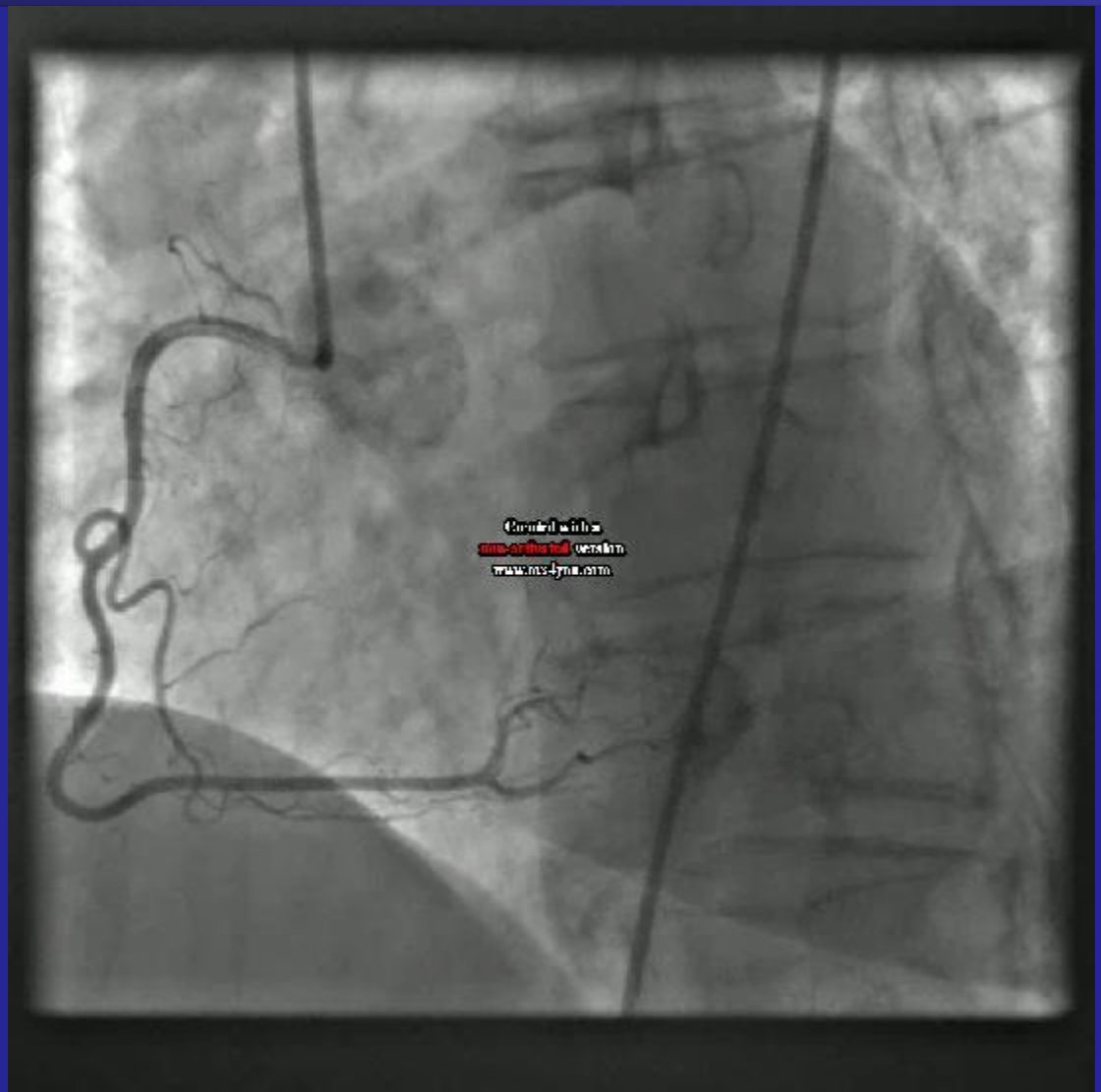
Si el campo no ha sido delimitado y centrado correctamente se pierde tiempo y se aumenta la dosis sin mejorar la información diagnóstica



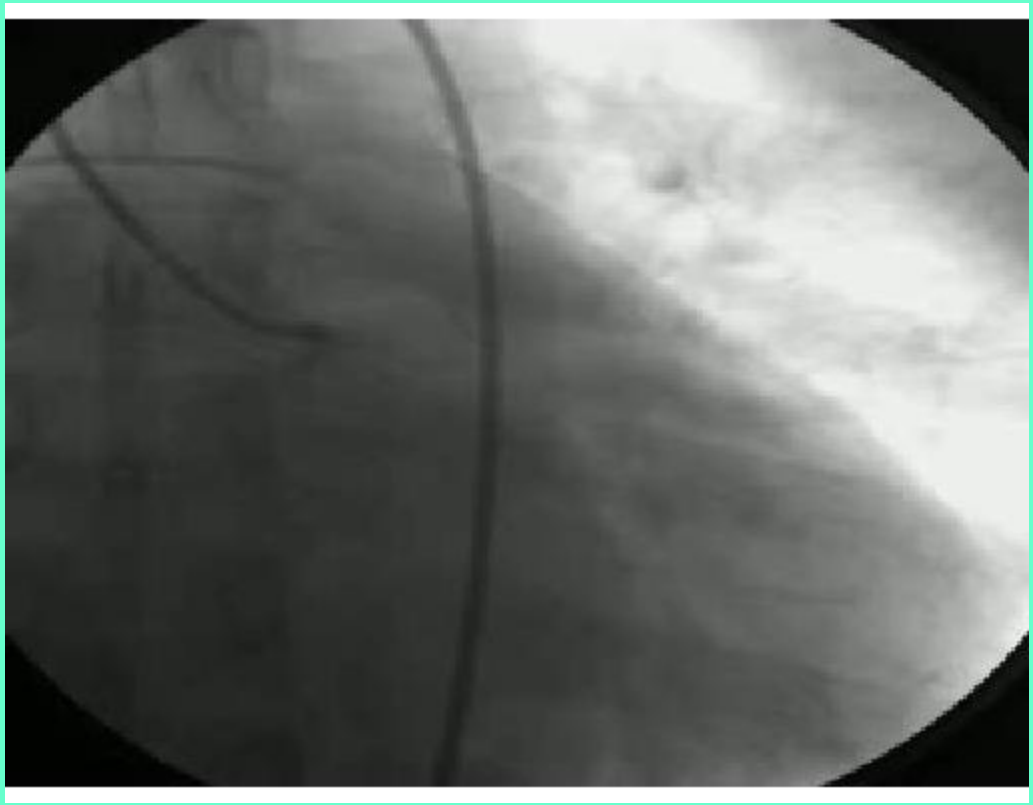
Siempre es mejor usar el tiempo de scopía para ajustar bien el campo y evitar que luego se realicen largas series de imágenes de cine..!!

1. Aquí se ve el campo incompleto en el momento inyectar el contraste y se debe correr el campo perdiéndose la imágen completa.. y perdiendo tiempo.. (incorrecto)

Aquí se ve la totalidad del campo de interés en el momento en que se inicia la secuencia de cine en coincidencia con el ingreso del contraste.. (correcto)

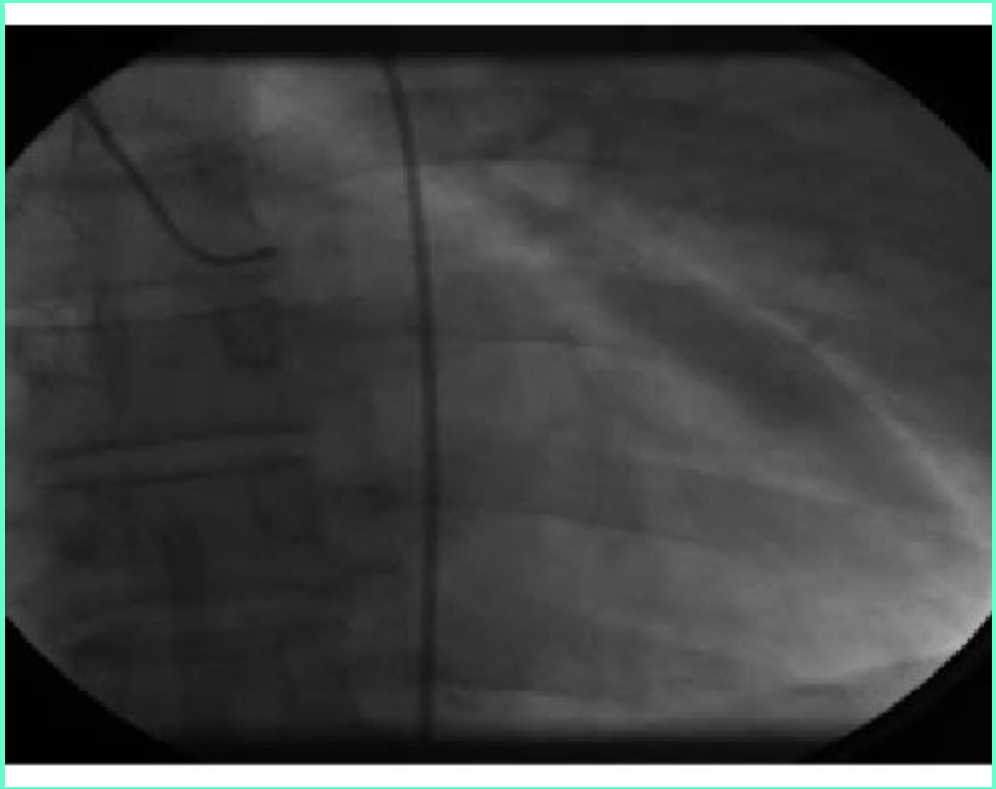


Un campo con densidades diferentes muy marcadas no permite ver todos los detalles con la misma nitidez y calidad..



[video clip]

El mismo campo pero corregido con un Filtro de cuña colocado adecuadamente que permite ver mejor todo el campo….



Además de mejorar la calidad de la imágen

se bajan las dosis en piel …y los riesgos.

An assistant at the end of the intervention MUST record, at least, the following information...:

All usefull data related with the pacient skin dose.....

PARAMETROS MEDIDOS	Valor de Alarma	Valor de Seguimiento
Pico de dosis en piel (PSD)	2000 mGy	3000 mGy
Kerma en aire en "Punto de Referencia"	3000 mGy	5000 mGy
Producto dosis área (DAP) (medido como Kerma . área)	300 $Gy.cm^2$	500 $Gy.cm^2$
Tiempo de scopía y/o Número de imágenes	30 min / 300 imág	60 min / 600 imág

Un procedimiento <u>nunca</u> se interrumpe por las dosis


Thanks..!
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