

Ablación con radiofrecuencia de nódulos tiroideos benignos

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~~LA CIRUGIA DEL
FUTURO~~

CÓMO TRATAR
TUMORES SIN OPERAR

Técnicas de ablación percutánea

- Químicas:
 - Alcoholización.
- Térmicas:
 - Crioterapia.
 - Radiofrecuencia.
 - Microondas.
 - Laser (fototerapia).
 - Ultrasonidos focalizados de alta intensidad.
 - Electroporación.

Radiofrecuencia: Fundamentos

- Aguja = electrodo = antena = termómetro
- El agua no transmite las ondas de radio.
- El cuerpo humano (70% agua) elevada resistencia.
- Corriente alterna de alta frecuencia (460-500 kHz).
- La energía se retiene alrededor de la aguja y se transforma en calor por agitación iónica y fricción de los tejidos.

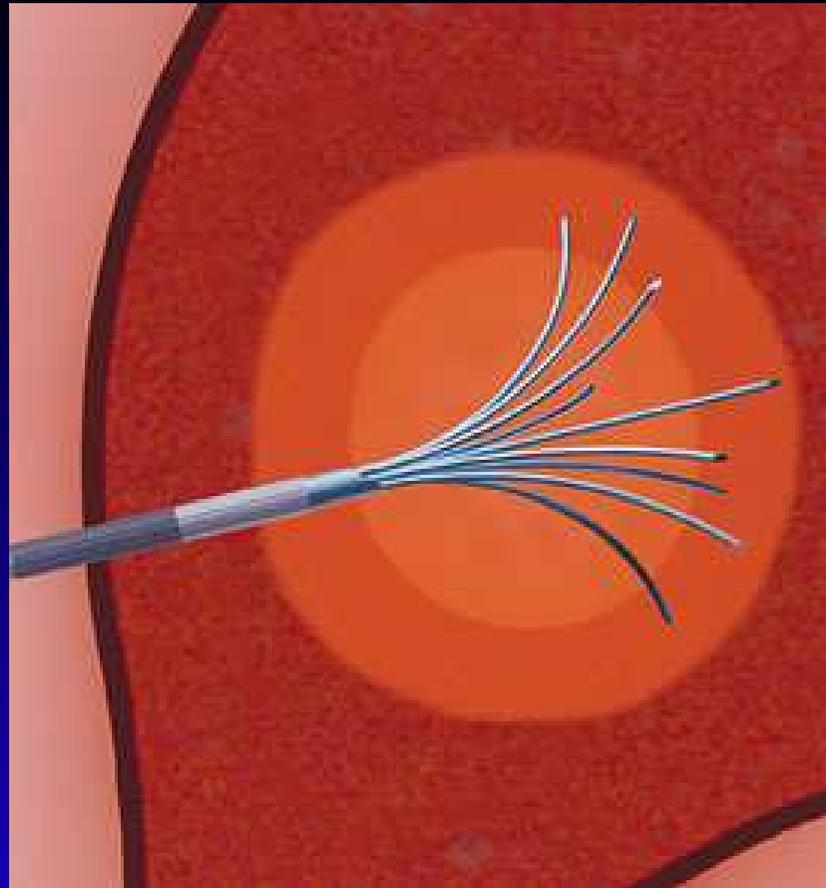
Radiofrecuencia: Fundamentos

- La elevación de la temperatura produce una necrosis coagulativa.
- Muerte celular en relación a la temperatura y el tiempo.
 - $> 50-55^{\circ}\text{C}$ durante 4 – 6 min.
 - $> 60^{\circ}\text{C}$ muerte instantánea.
- Vaporización, deshidratación i carbonización.

Radiofrecuencia: Fundamentos

- Tipos de aguja:
 - Expandibles.
 - Simples.
- Tipos de refrigeración:
 - Refrigeración interna de la aguja.
 - Refrigeración periferia de la aguja.
- Control exposición:
 - Temperatura.
 - Impedancia.

Radiofrecuencia: Fundamentos



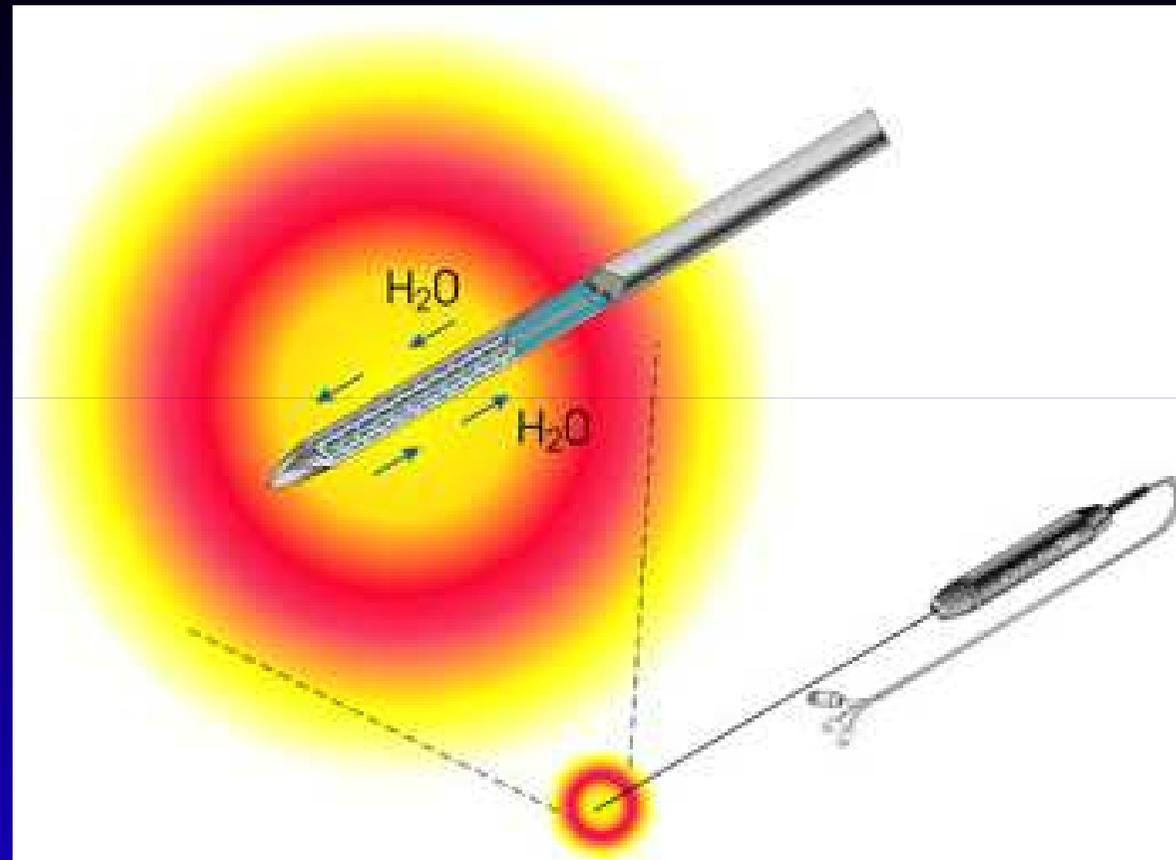
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Radiofrecuencia: Fundamentos



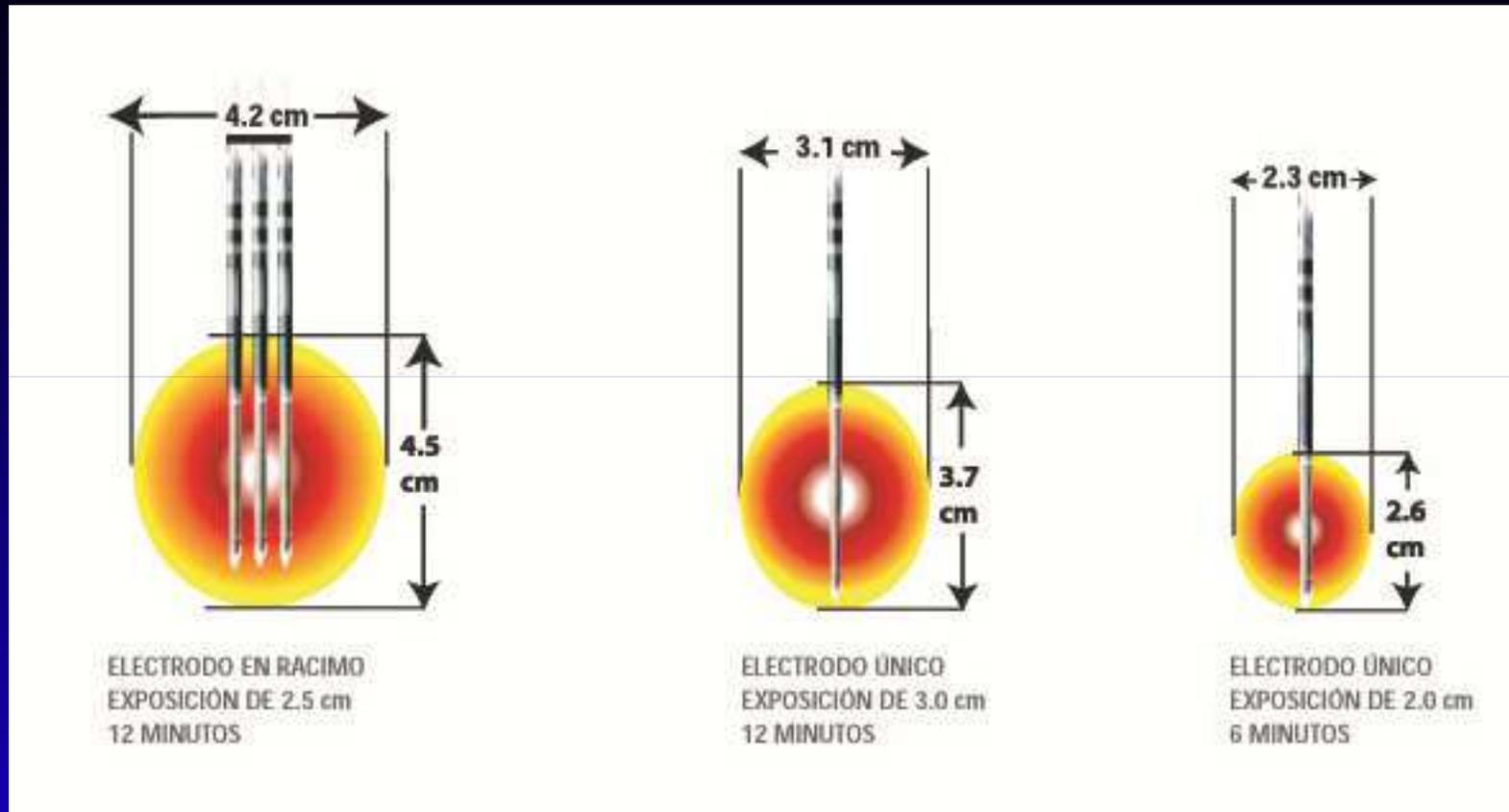
LeVein

Radiofrecuencia: Fundamentos



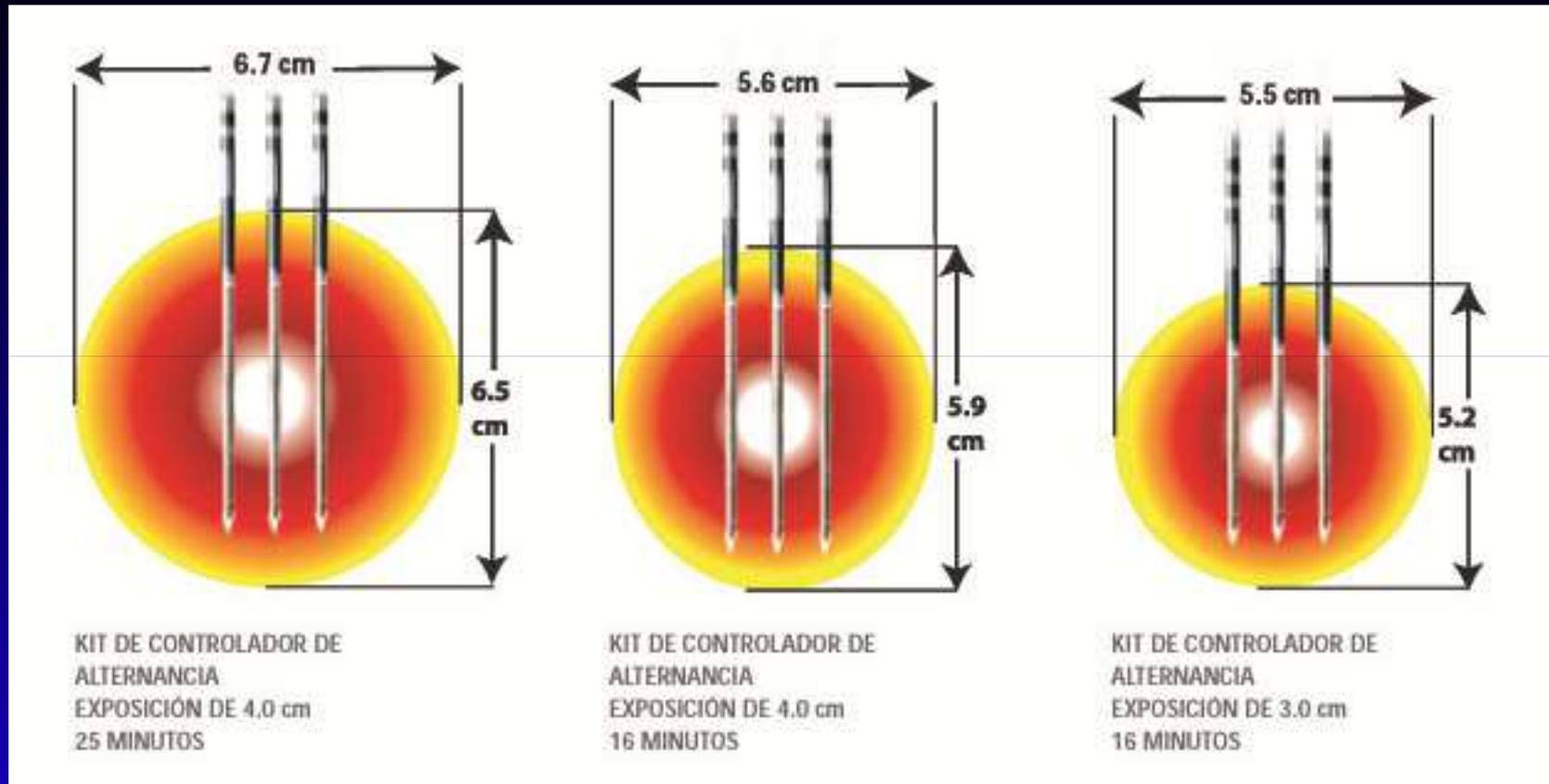
Radionics - Valleylab

Radiofrecuencia: Fundamentos



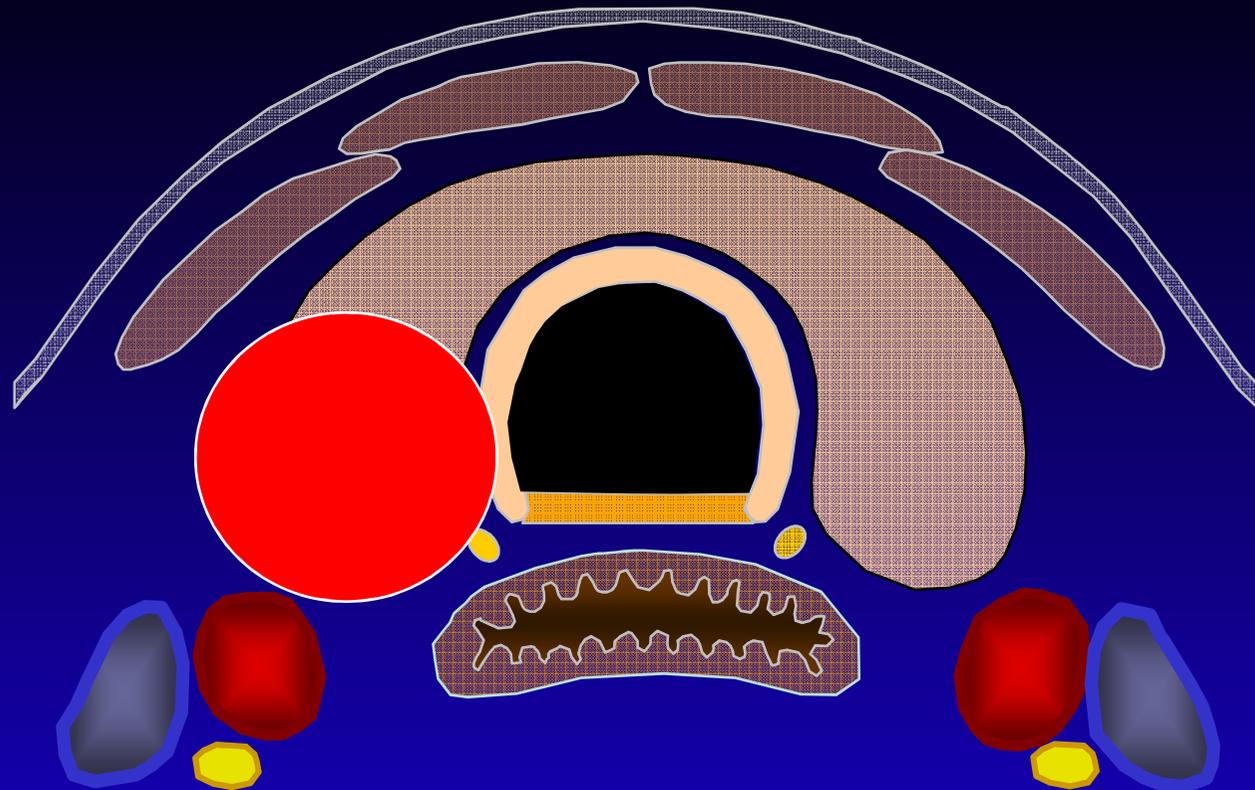
Radionics - Valleylab

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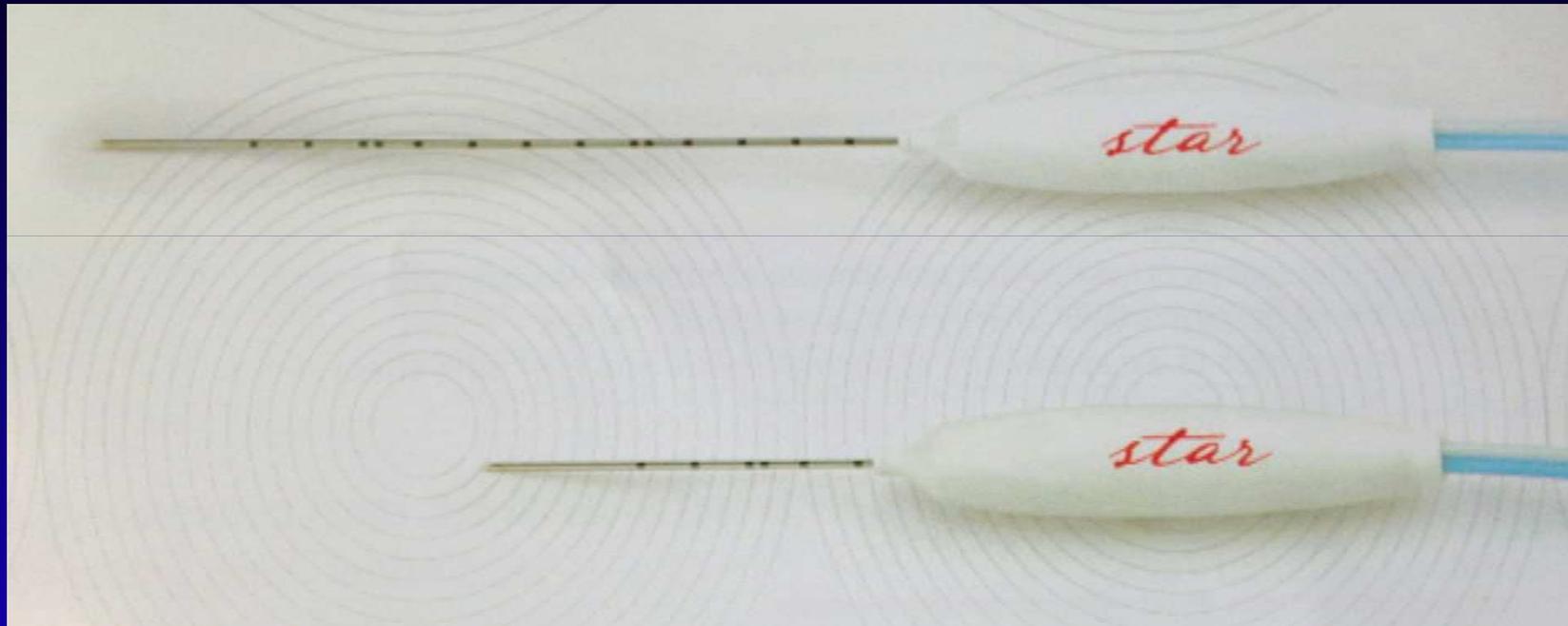


Radionics - Valleylab

Radiofrecuencia: Fundamentos

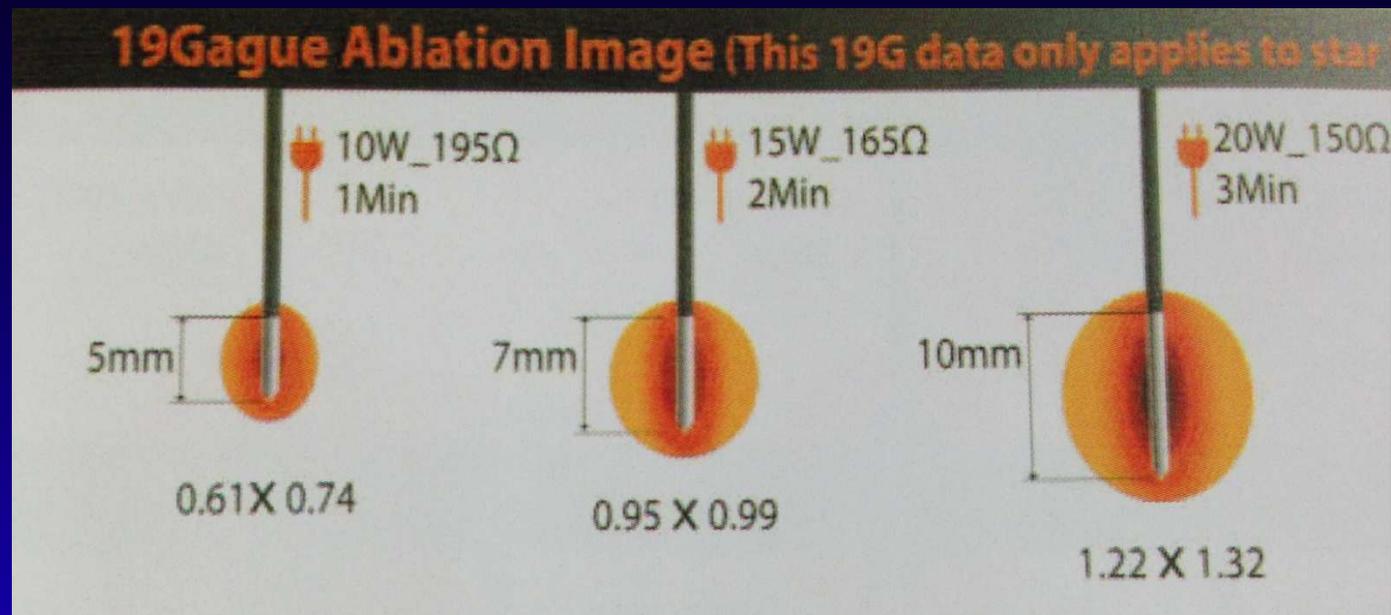


Radiofrecuencia: Fundamentos



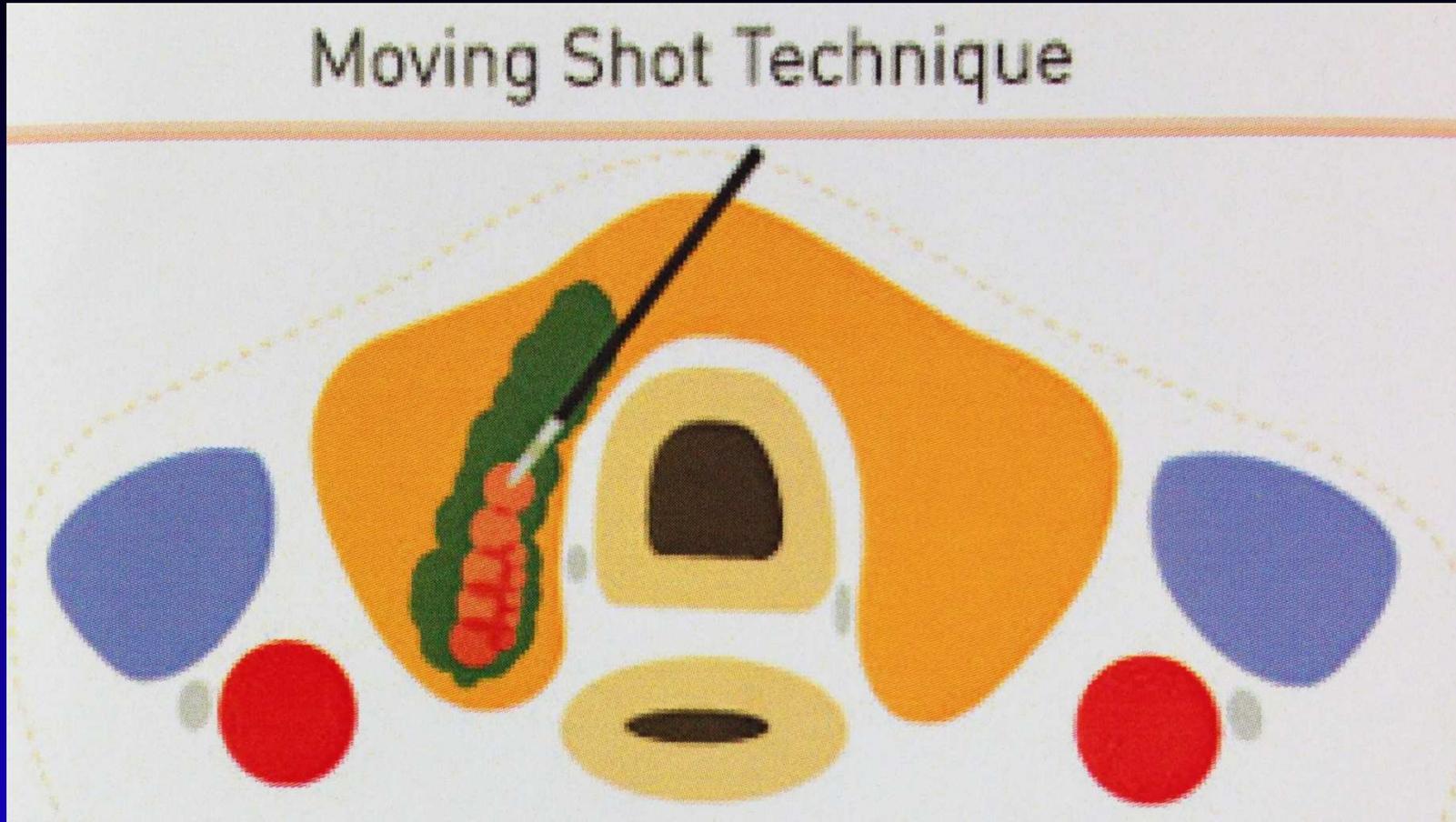
StarMed - JJPHospitalaria

Radiofrecuencia: Fundamentos



Starmed - JJPHospitalaria

Radiofrecuencia: Fundamentos



Starmed - JJPHospitalaria

Manejo del nódulo tiroideo benigno

- Seguimiento. Con o sin punción.
- Tratamiento con levotiroxina.
- Tratamiento con radioyodo (hiperfuncionantes).
- Cirugía.

CAMBIO DE PARADIGMA

- Ablación percutánea con radiofrecuencia.

Indicaciones de la RF tiroidea

- Nódulos tiroideos benignos predominantemente sólidos (>80%). Dos punciones.
- Crecimiento significativo.
- Signos compresivos: Molestias, sensación de cuerpo extraño, dolor, disfagia, dipnea, disfonía o tos.
- Riesgo quirúrgico.

Indicaciones de la RF tiroidea

- Elevado riesgo de complicaciones secundarias al hipotiroidismo post-tratamiento (deseo de fertilidad, insuficiencia cardíaca, cardiopatía isquémica)
- Dificultades en el tratamiento sustitutivo con levotiroxina (malabsorción, gastritis atrófica, gastrectomizados, intolerancia gastrointestinal)
- Rechazo al tratamiento convencional.



Contraindicaciones de la RF tiroidea

- Antecedentes familiar de primera línea de cáncer de tiroide o neoplasias endocrinas múltiples.
- Portador de dispositivos implantables eléctricos o metálicos (excepto en electrodos bipolares)
- Parálisis de la cuerda vocal contralateral.
- Crecimiento intratorácico significativo superior a 1cm.

El procedimiento.

- De forma ambulatoria. Dos horas de observación. Coagulación y laringoscopia.
- Anestesia local.
- Sin sedación.
- Control ecográfico. Técnica del “moving shot”.
- Acceso a través del istmo.
- Administración de contraste endovenoso.
- Duración de 45 minutos.
- Alerta con pacientes con marcapasos y prótesis.

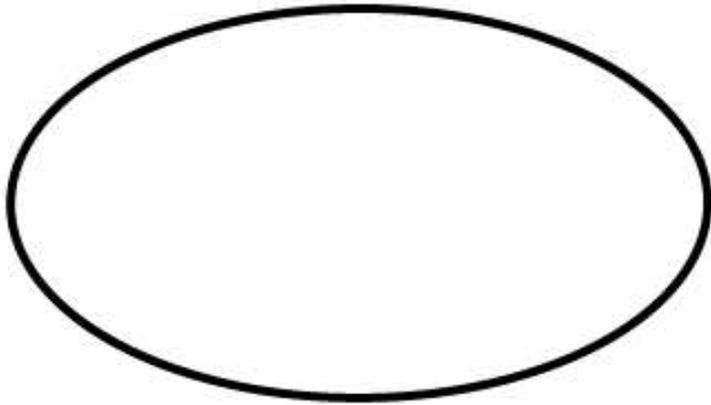
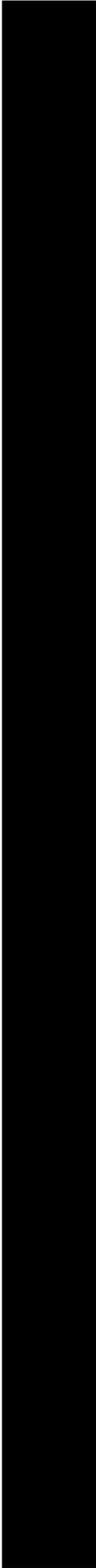
El procedimiento.

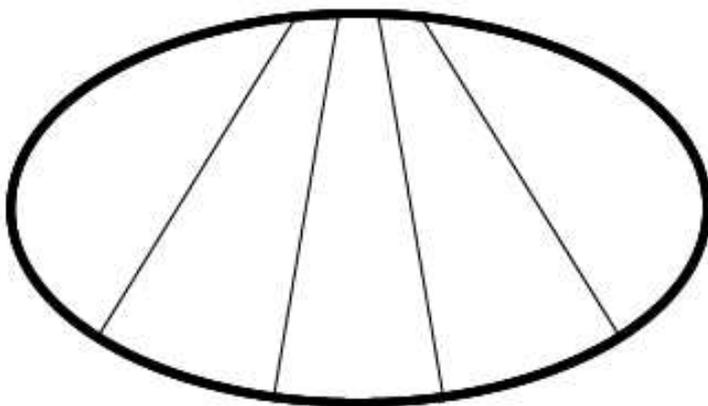
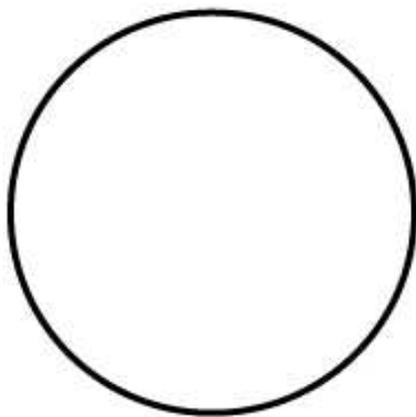
- Valoración nervio recurrente:
 - Laringoscopia indirecta
 - Ecografía:

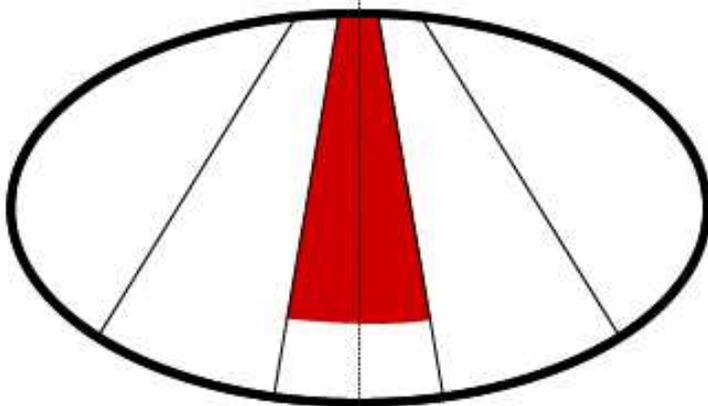
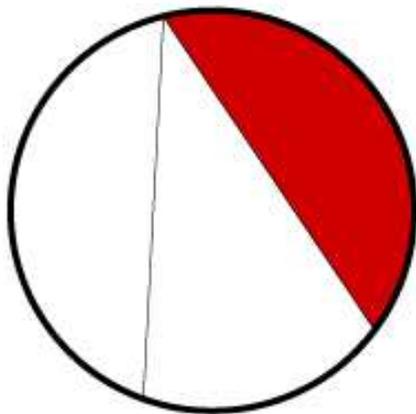


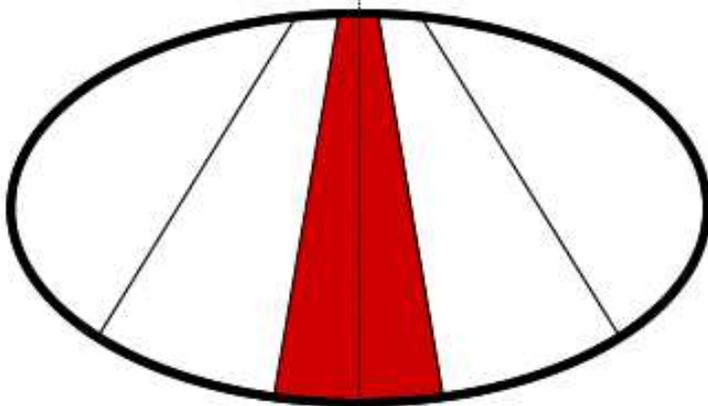
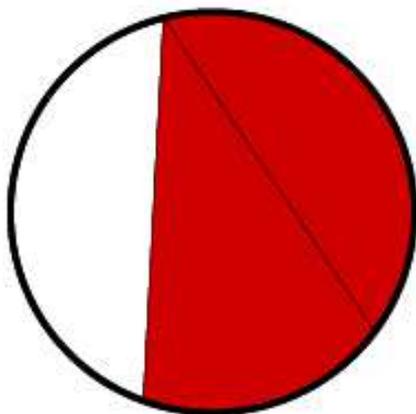
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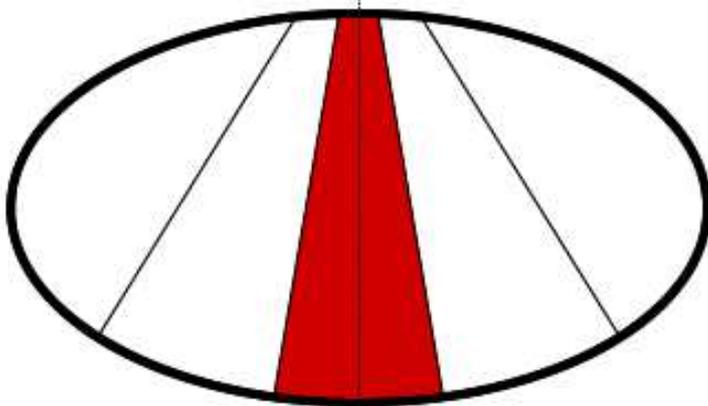
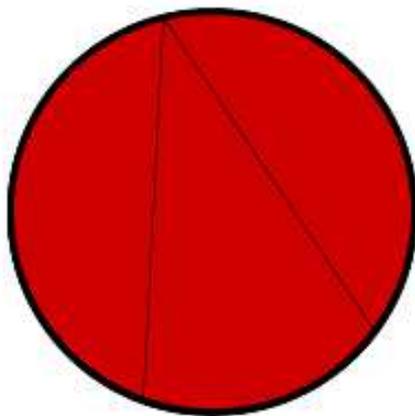
- De forma ambulatoria. Dos horas de observación. Coagulación y laringoscopia.
- Anestesia local. Via venosa. Pulsioxímetro.
- Sin sedación. Medidor de presión.
- Control ecográfico. Técnica del “moving shot”.
- Acceso a través del istmo.
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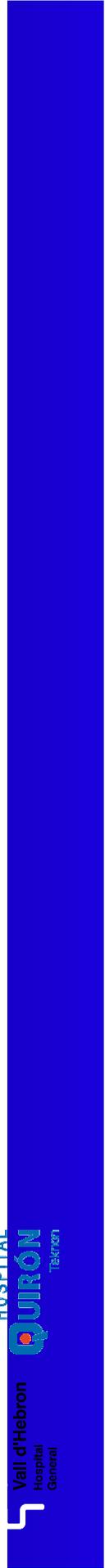
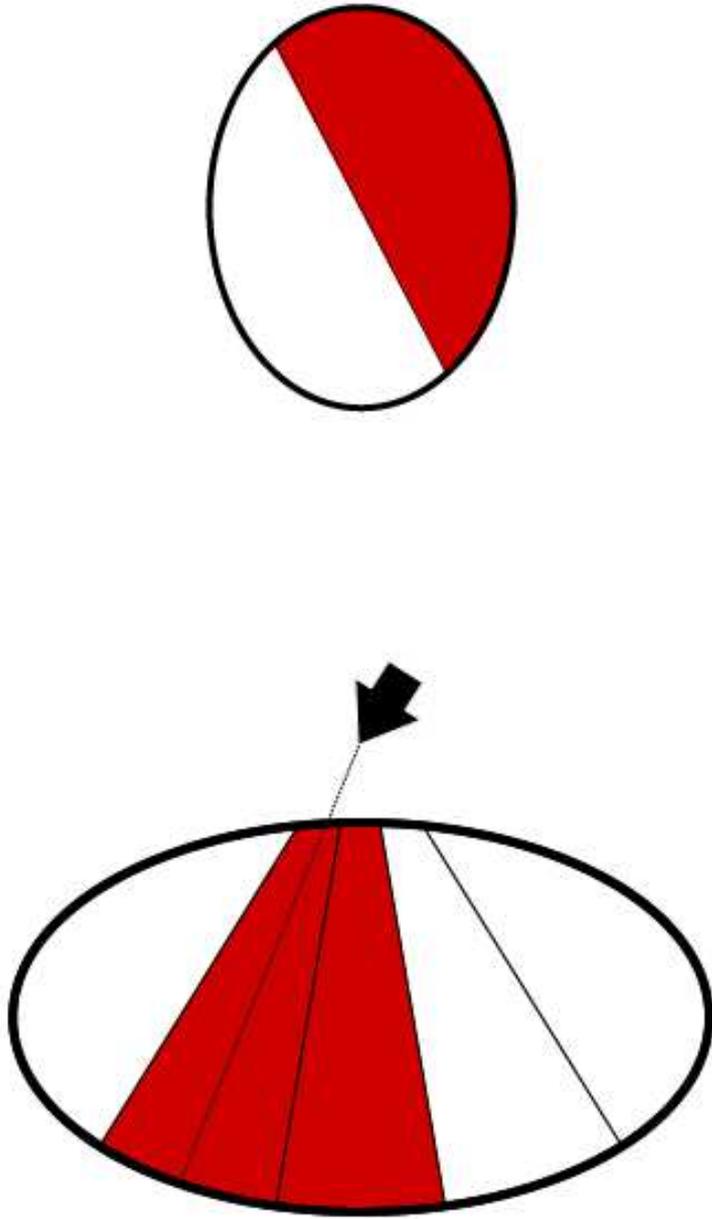
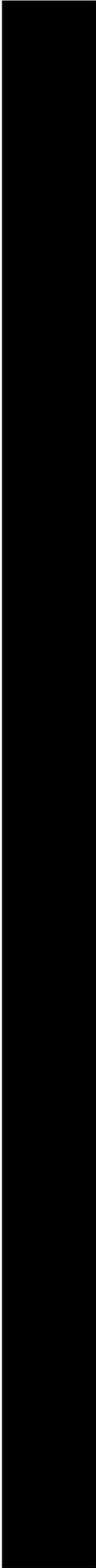


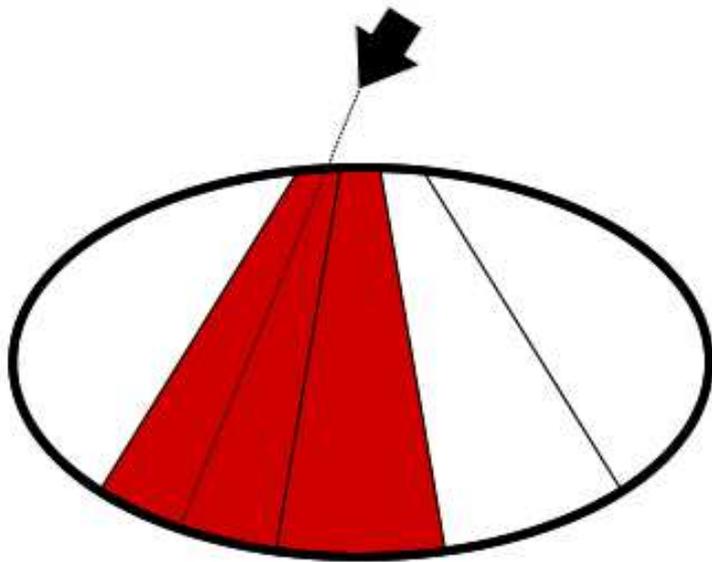
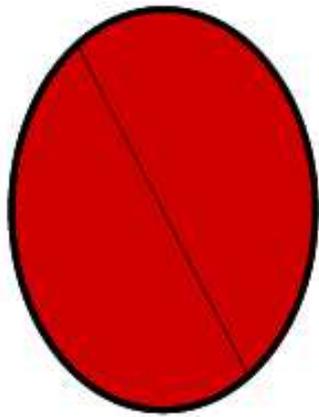


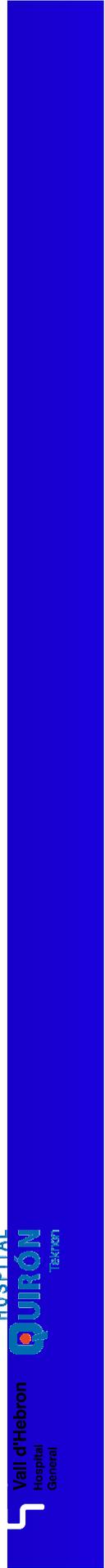
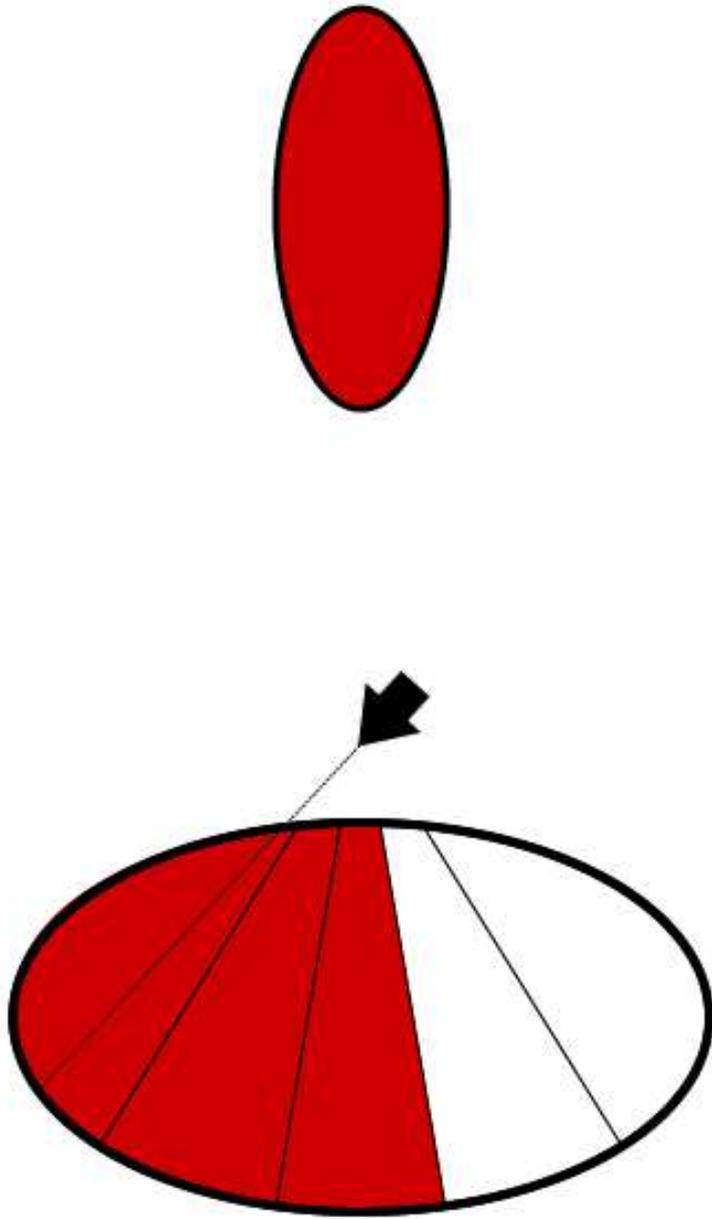
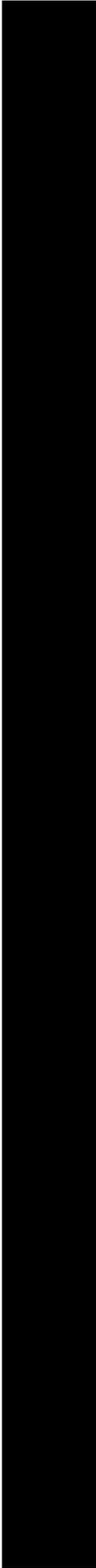


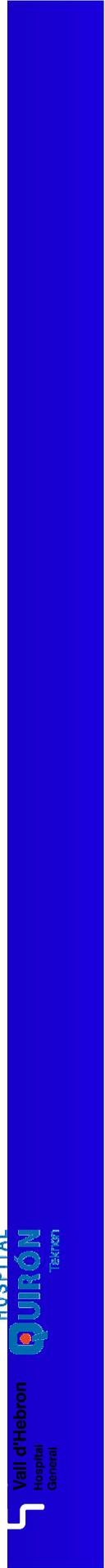
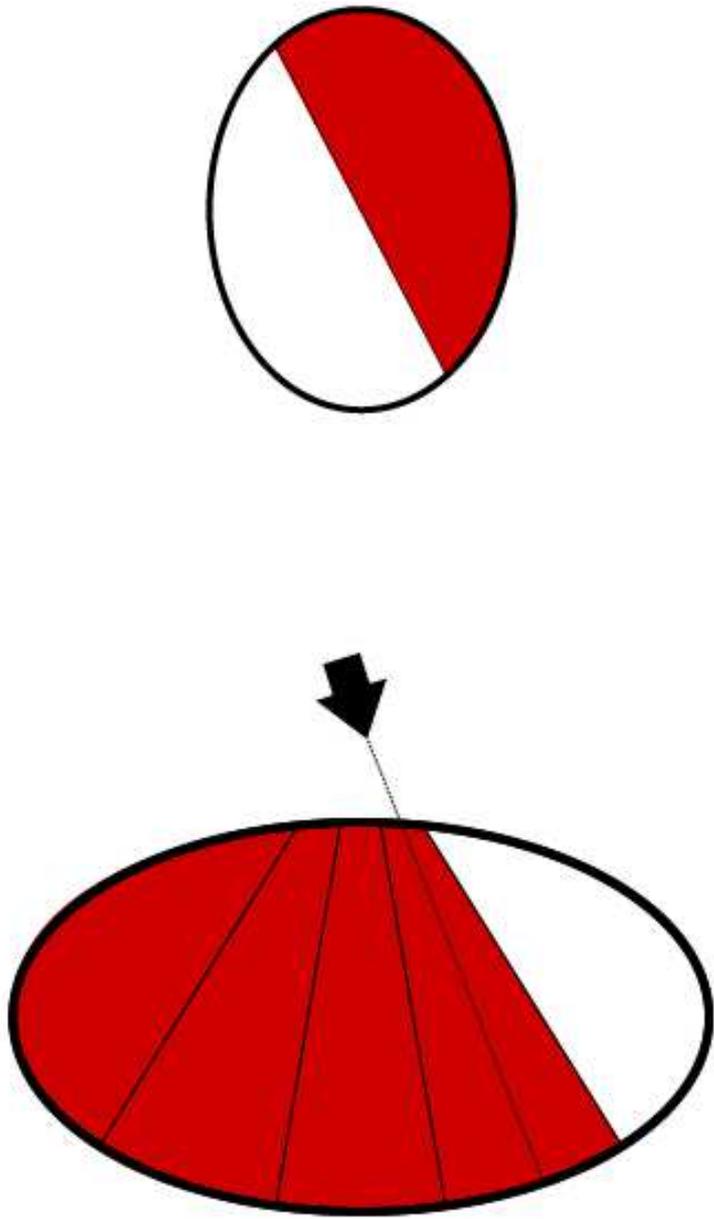
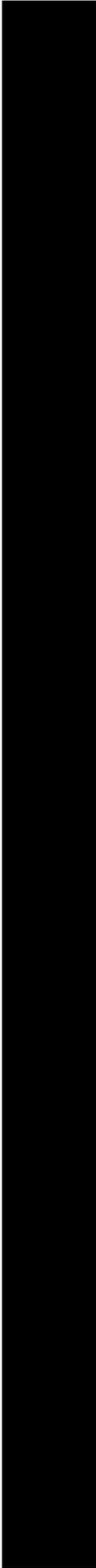


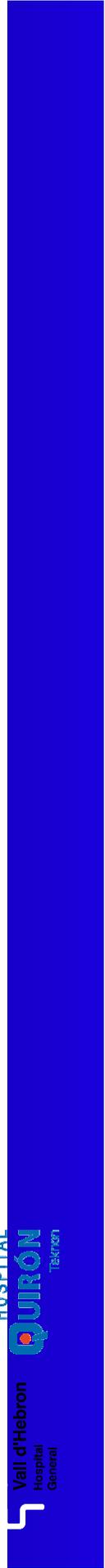
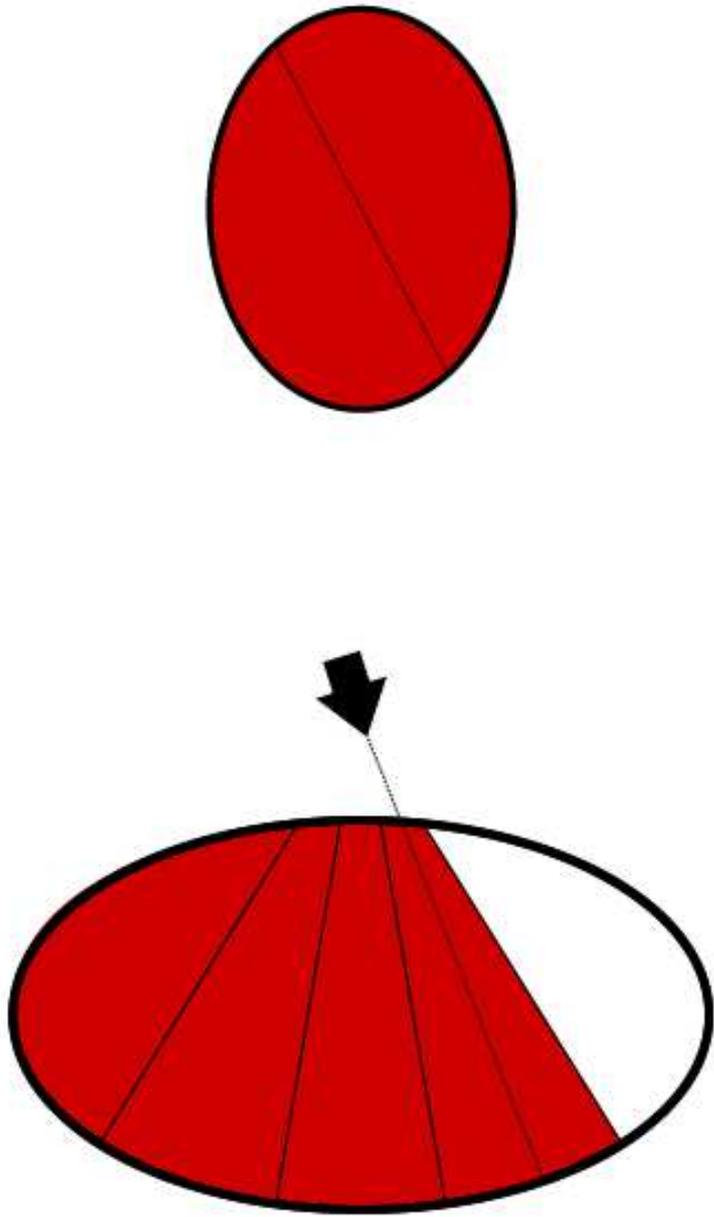
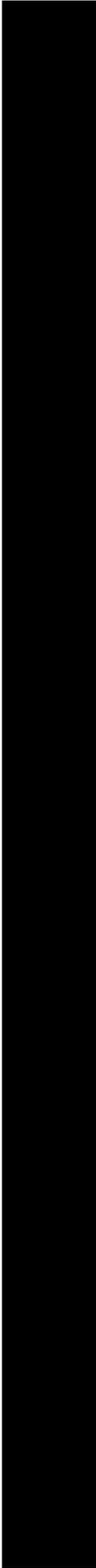


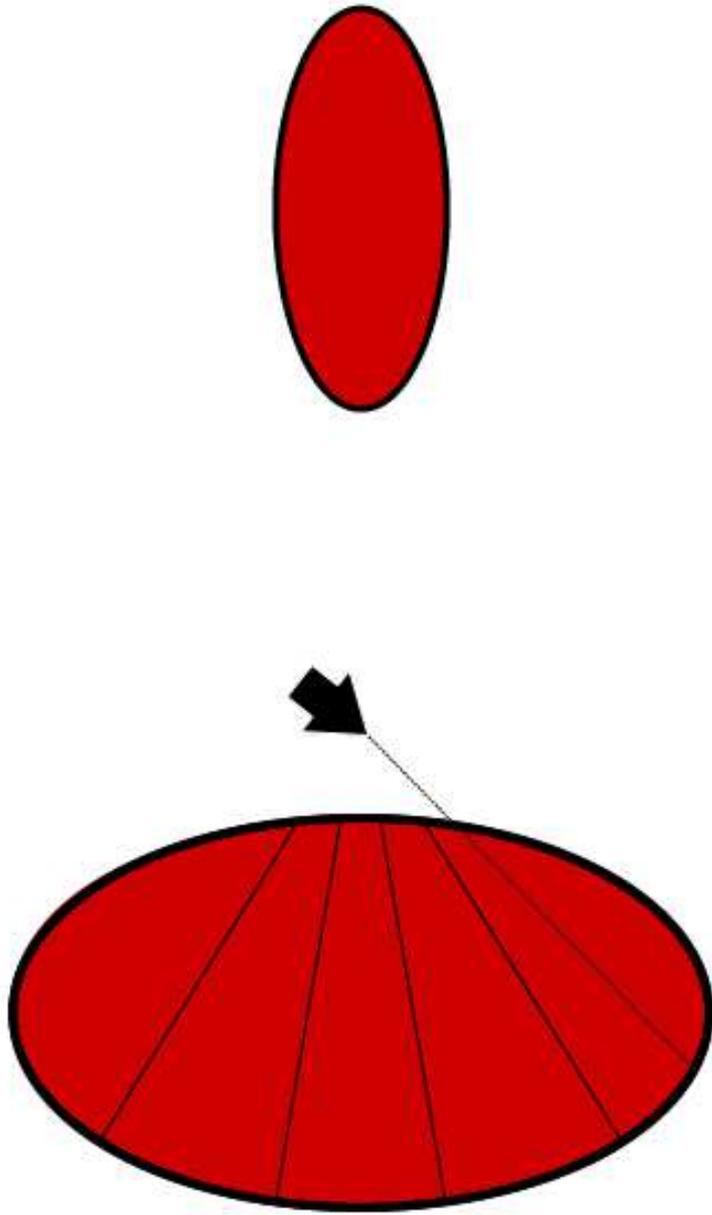
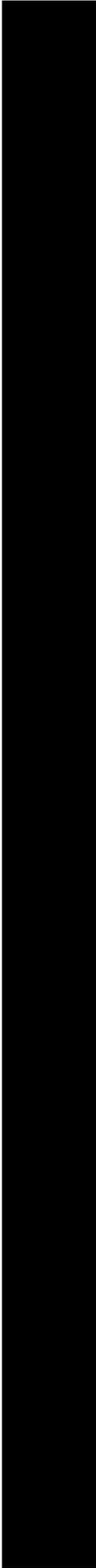


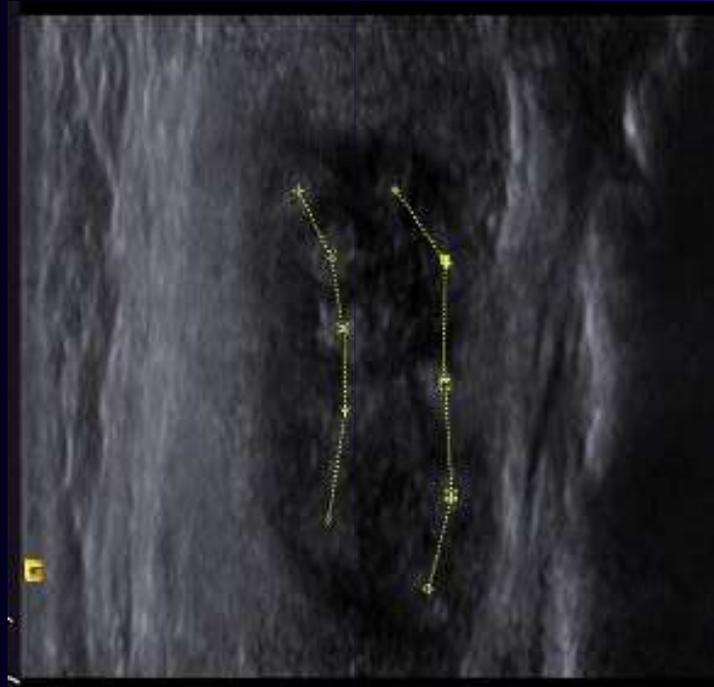




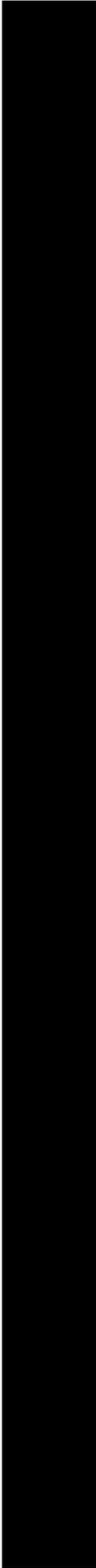


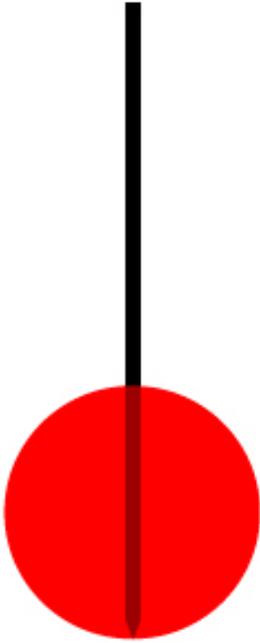


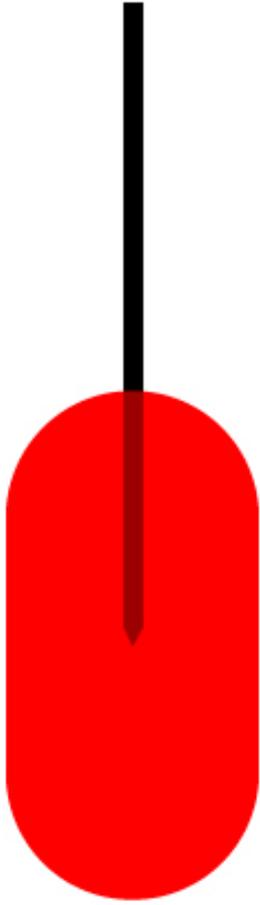


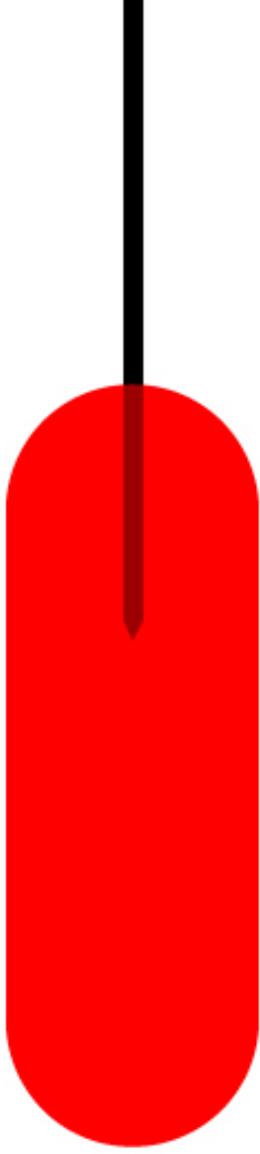


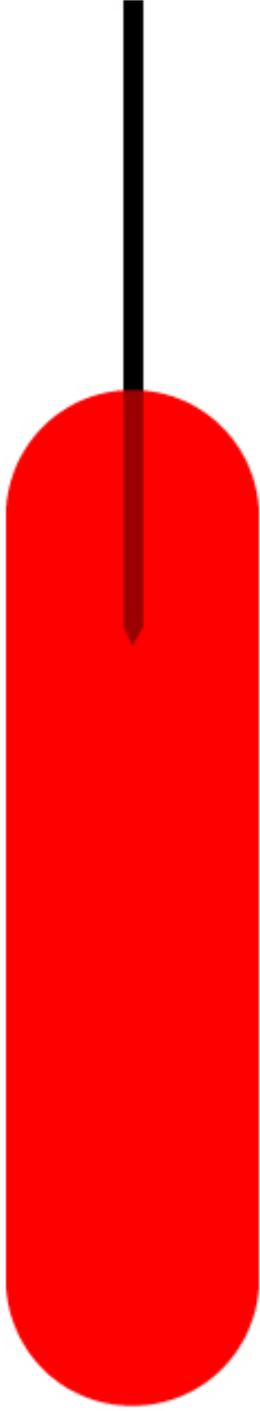


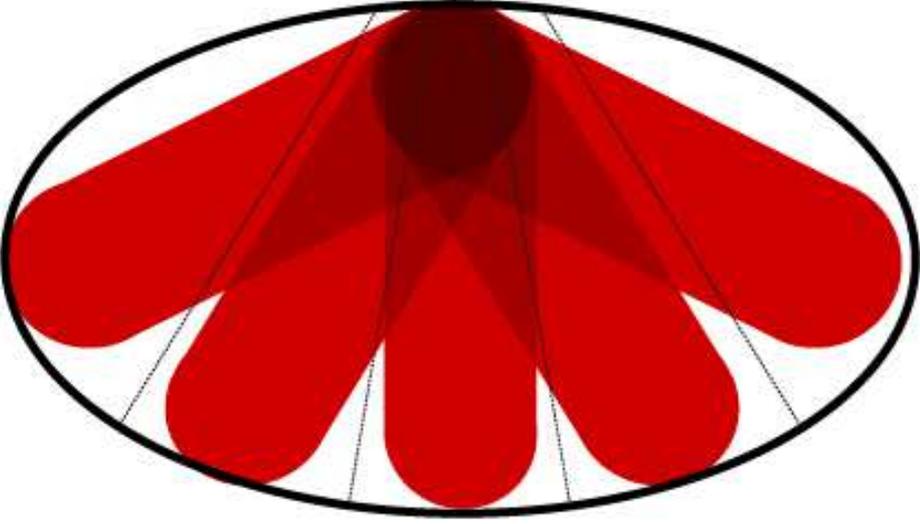


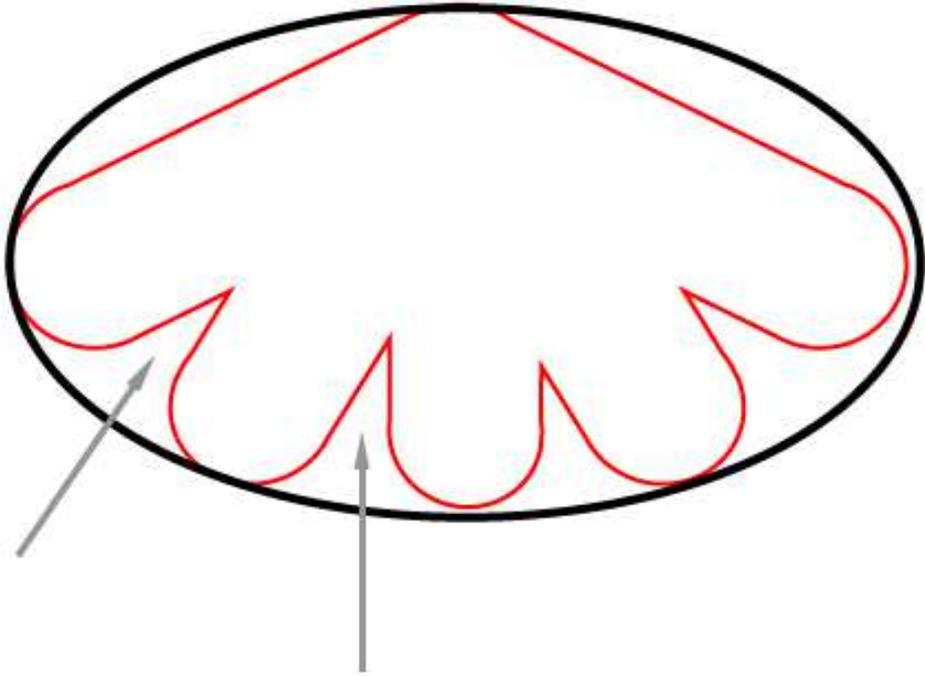


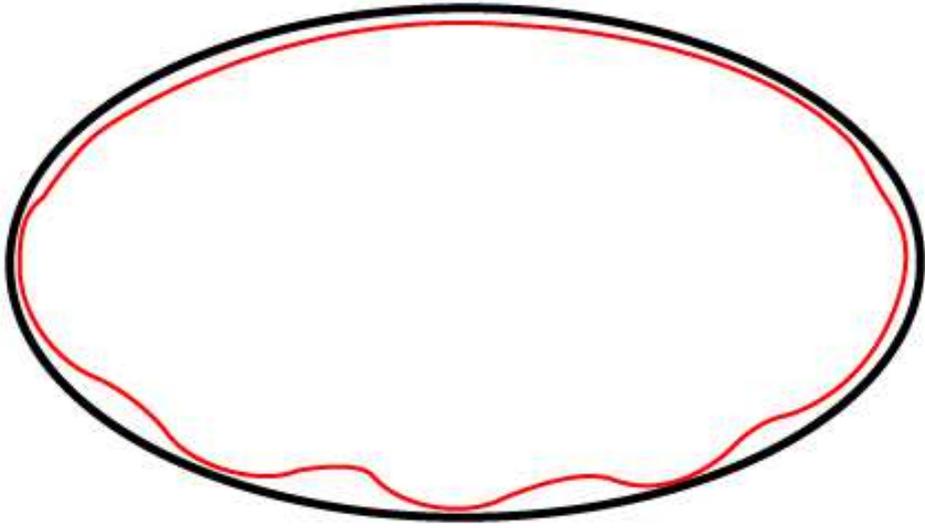


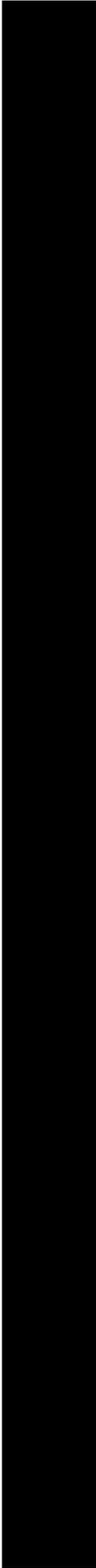


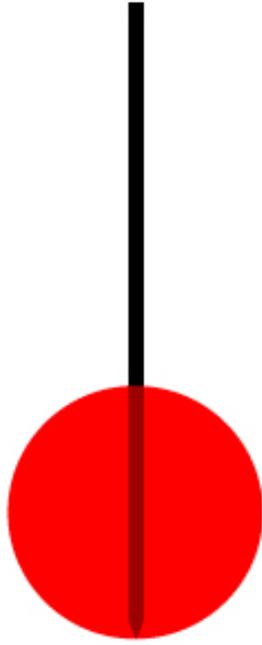


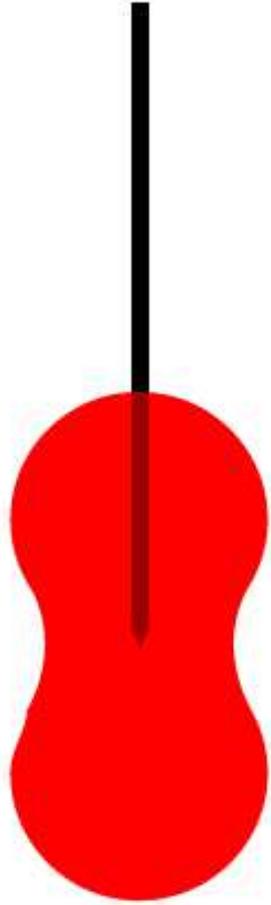


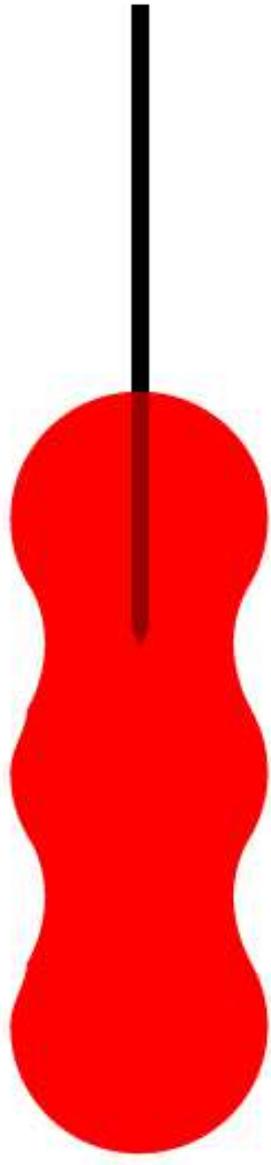


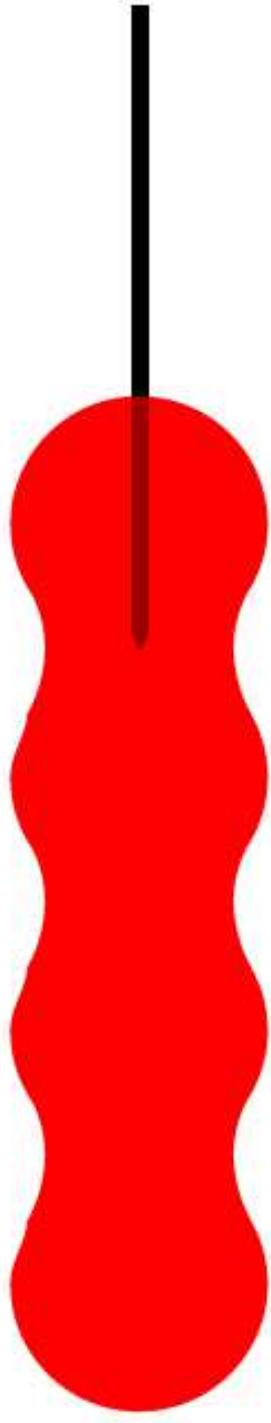


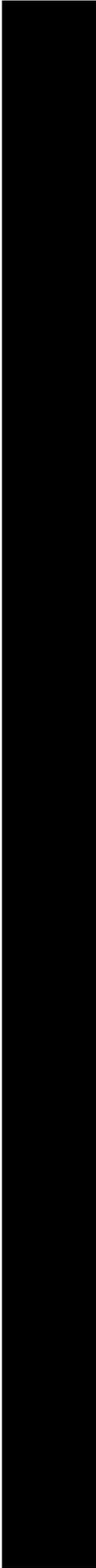


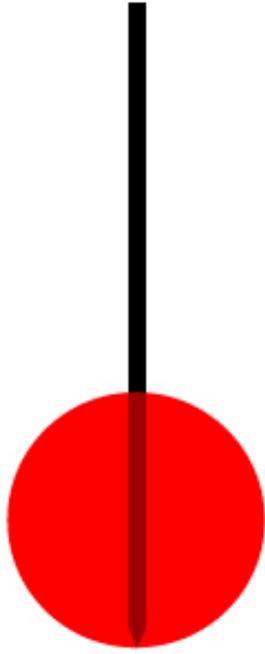


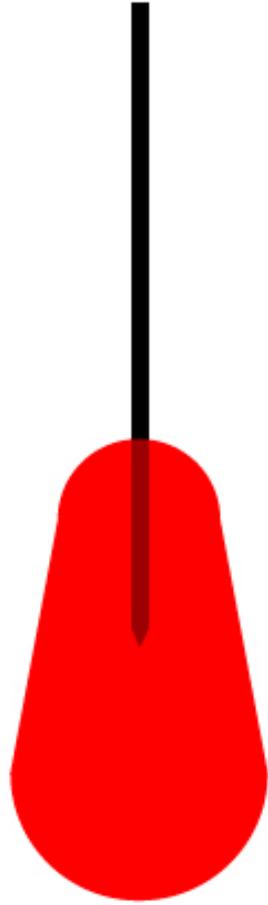


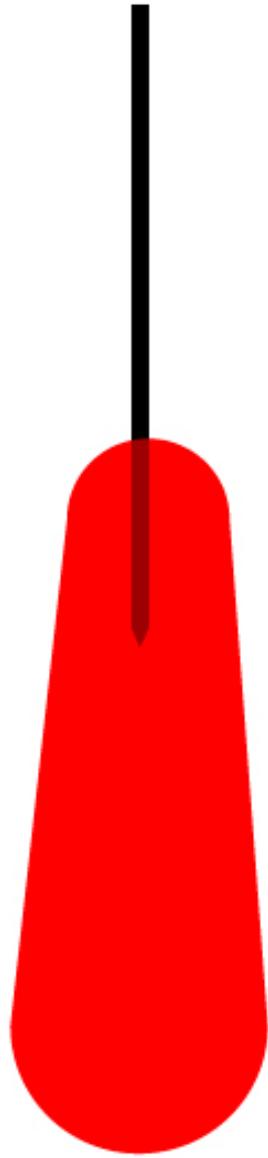


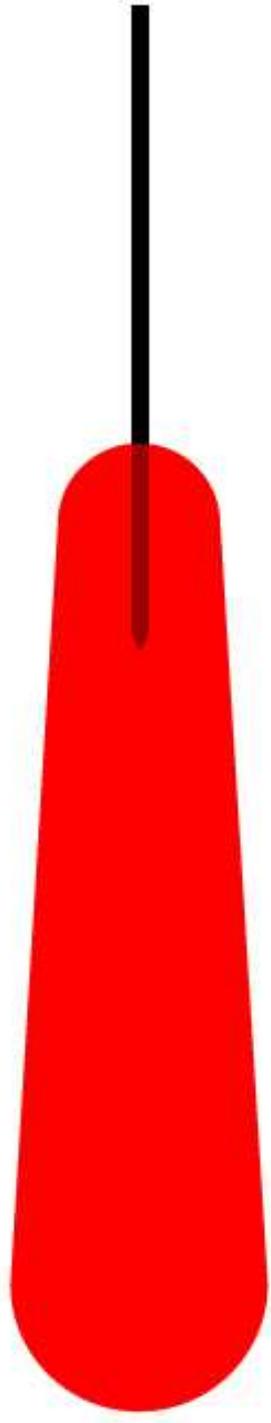


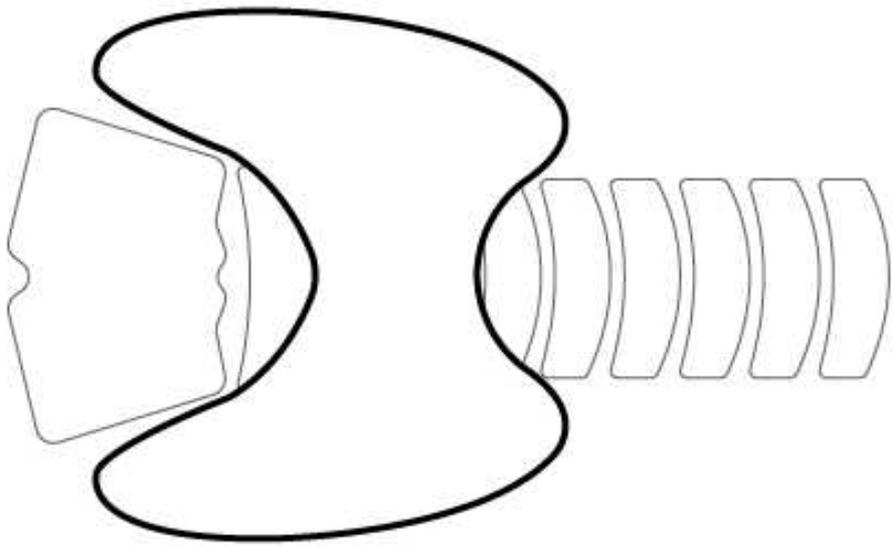


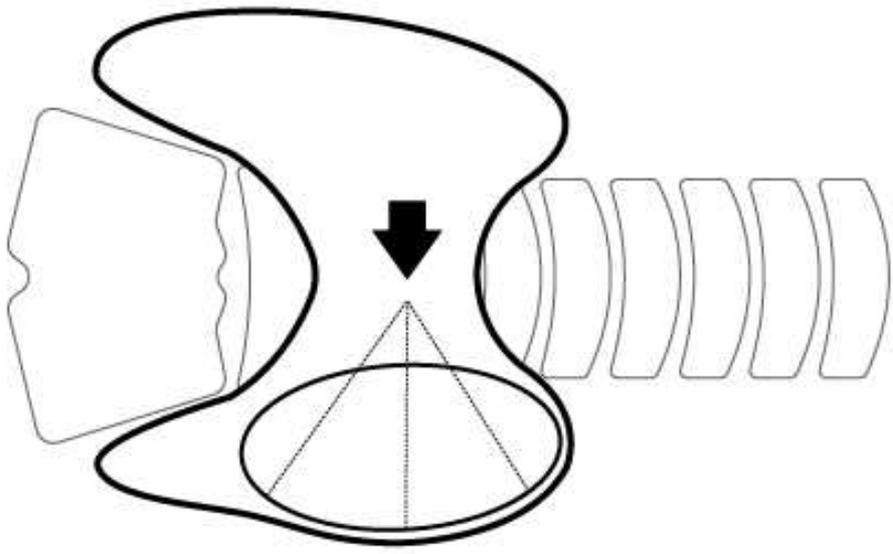


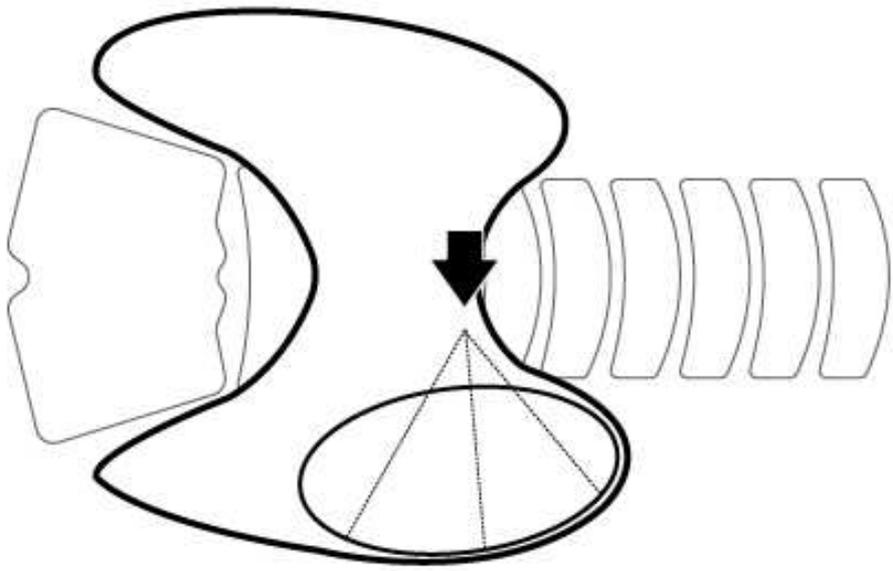


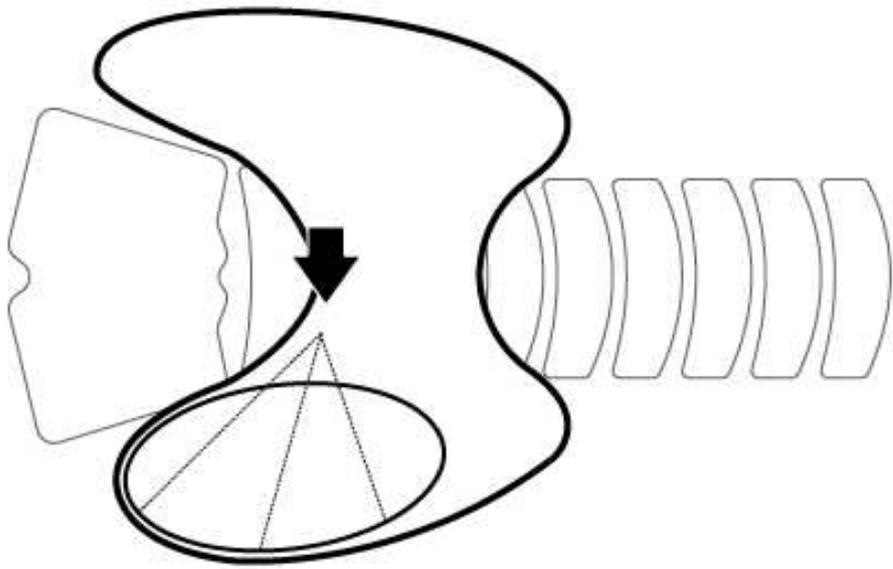


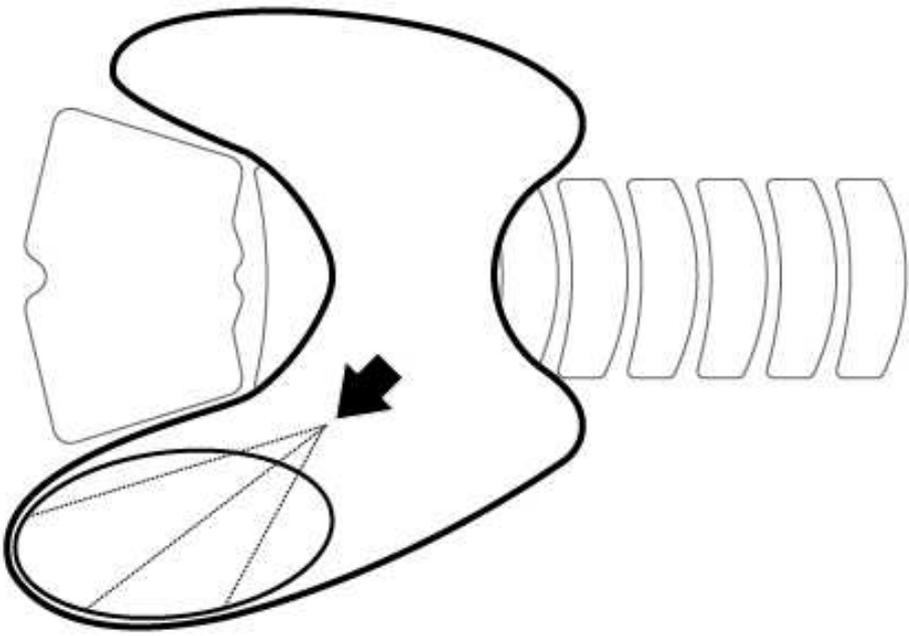








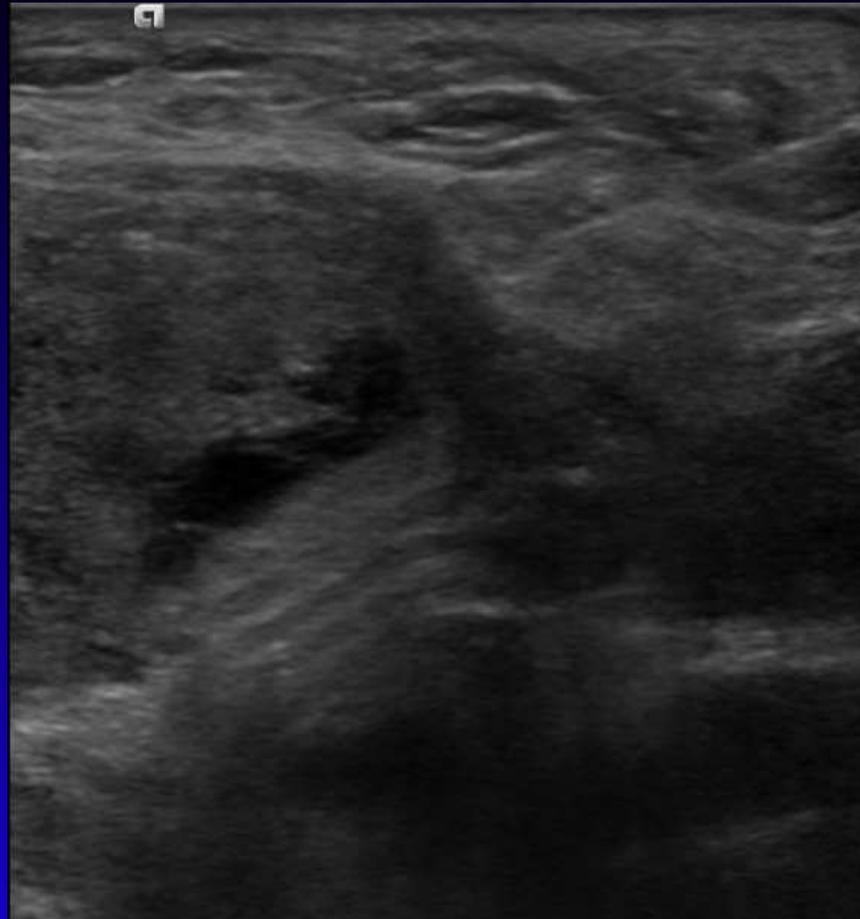




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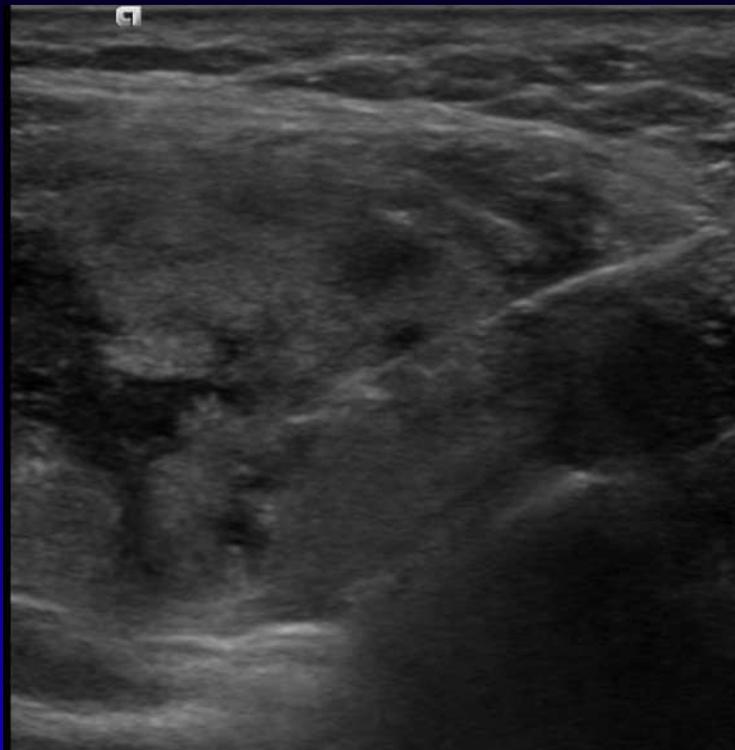
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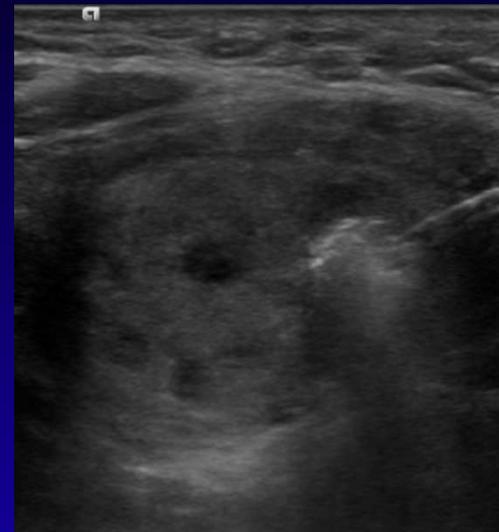
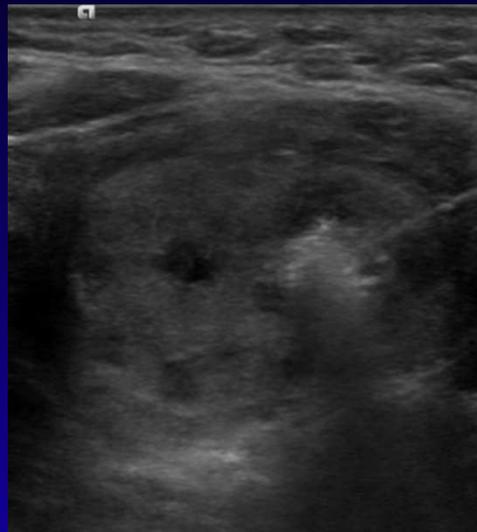
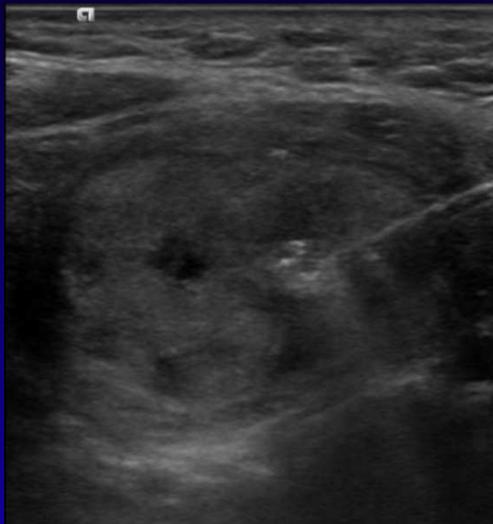
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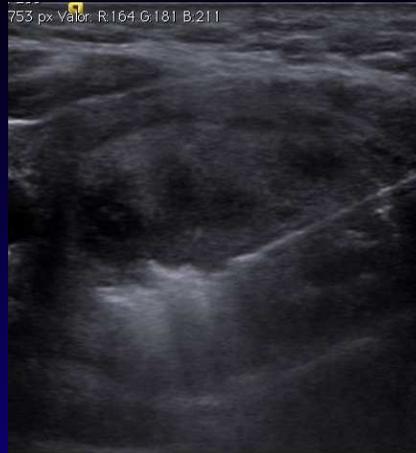
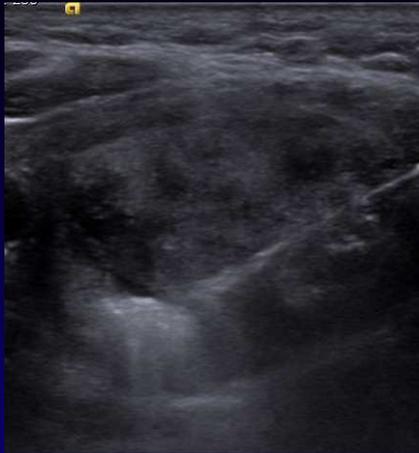
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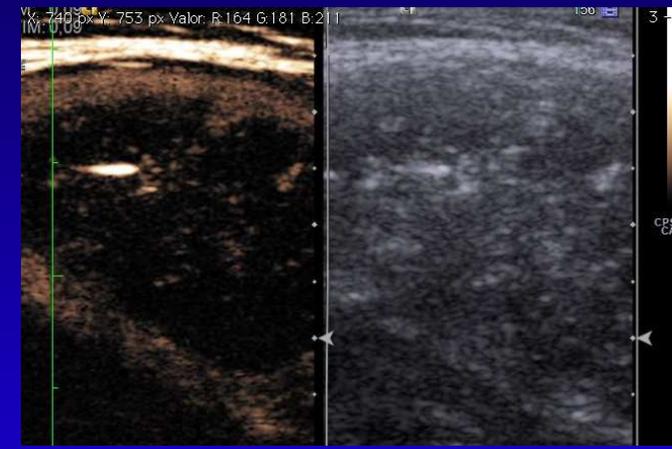
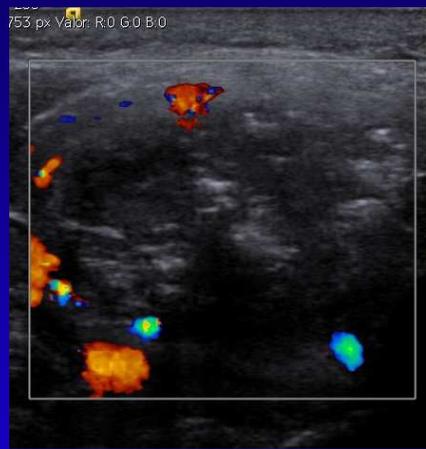
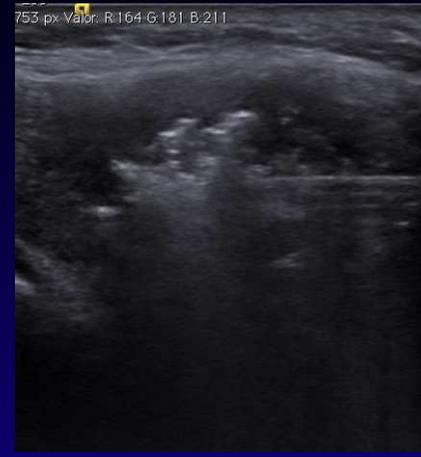
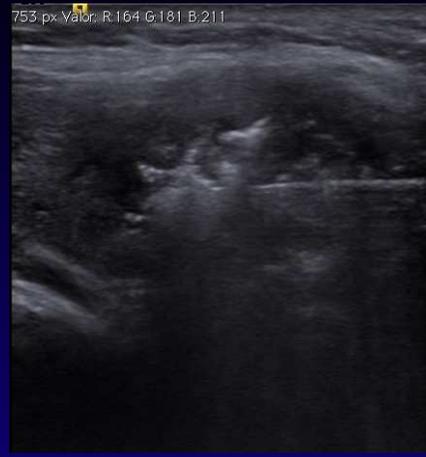
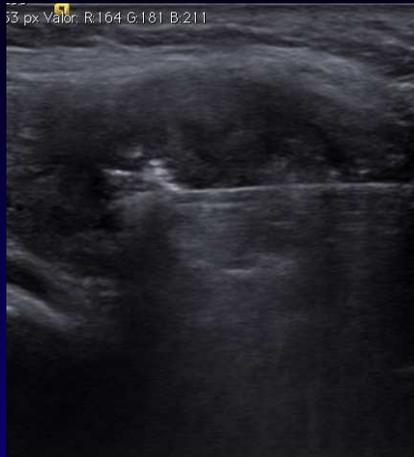
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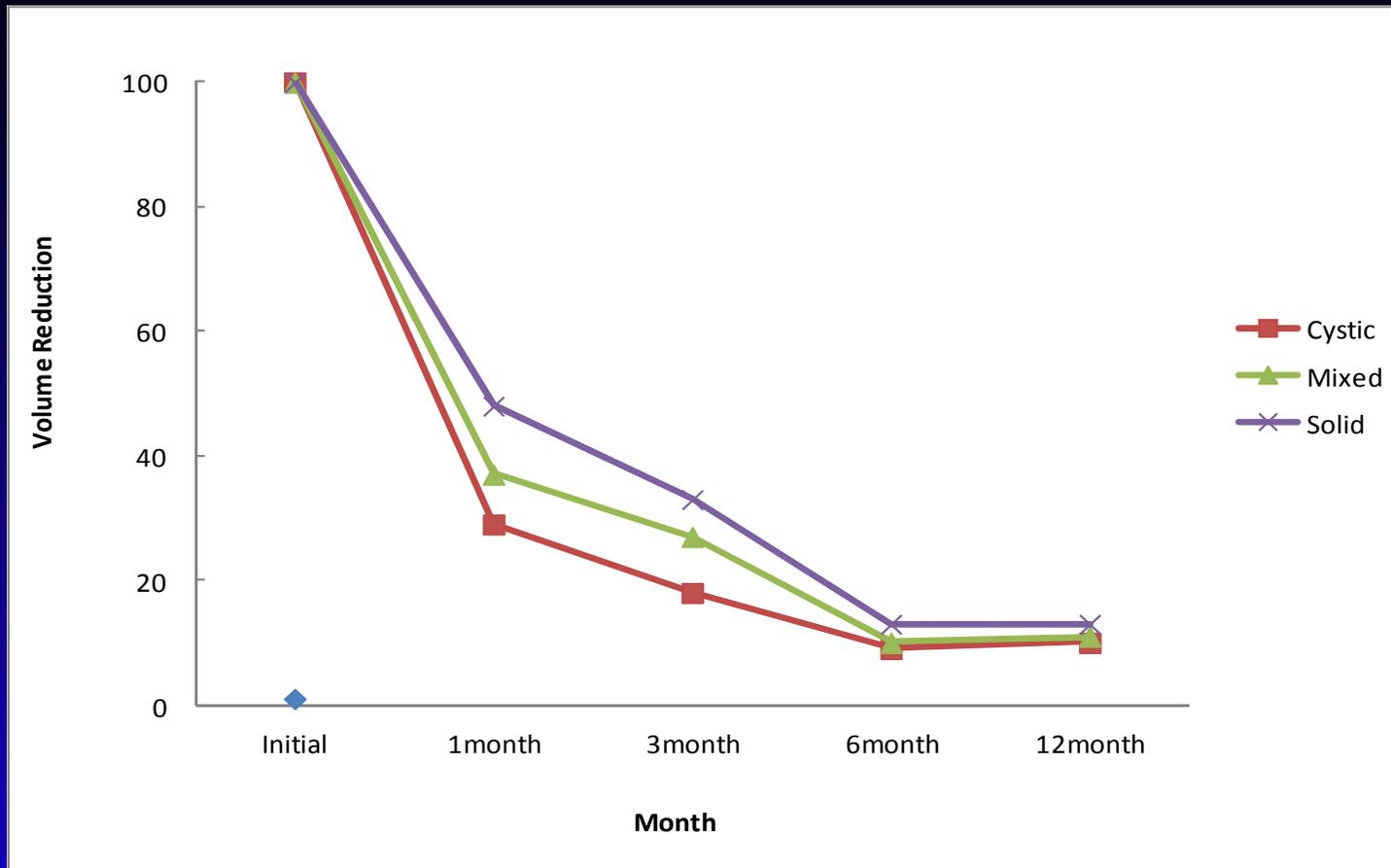
El procedimiento.



Resultados

- Mayor efectividad que el láser.
- Reducción de volumen de 30 - 61% al mes.
- Reducción de volumen de 80 - 93,5% a los 4 - 12 meses.
- Disminución de los síntomas en el 100%.
- Recurrencias del 1 - 5,6% a los 4 - 7 años.
- Mejora del hipertiroidismo en los funcionantes 75%.

Resultados



Resultados



Resultados



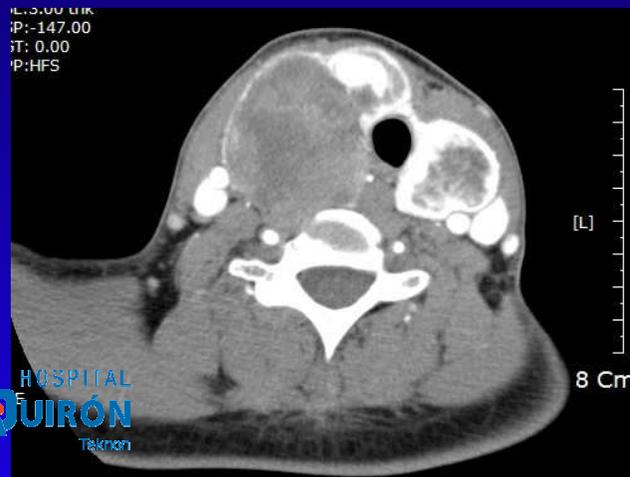
Resultados



3 sessions after RFA

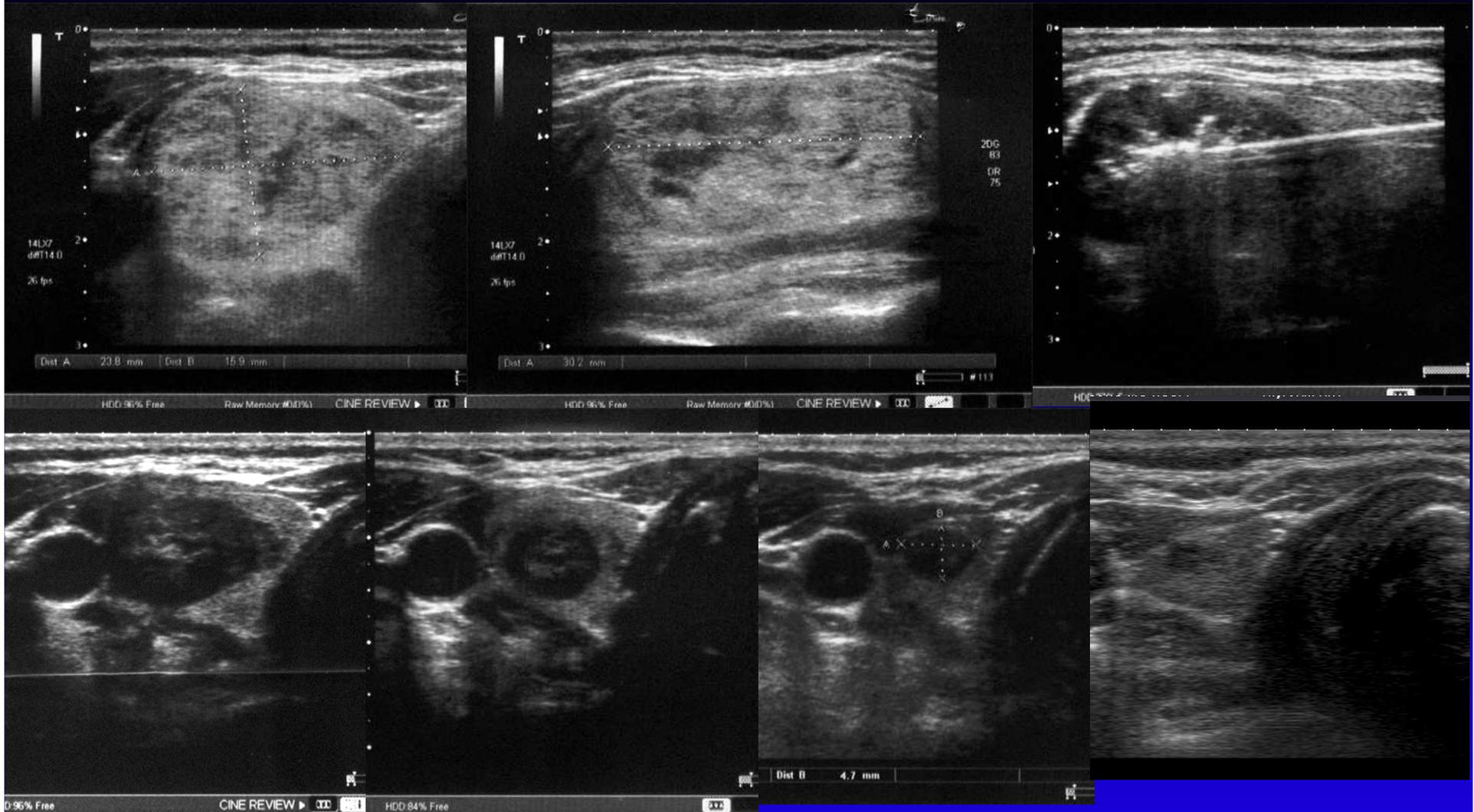
Resultados

3 sesiones de
ARF
40 meses de
seguimiento



Resultados

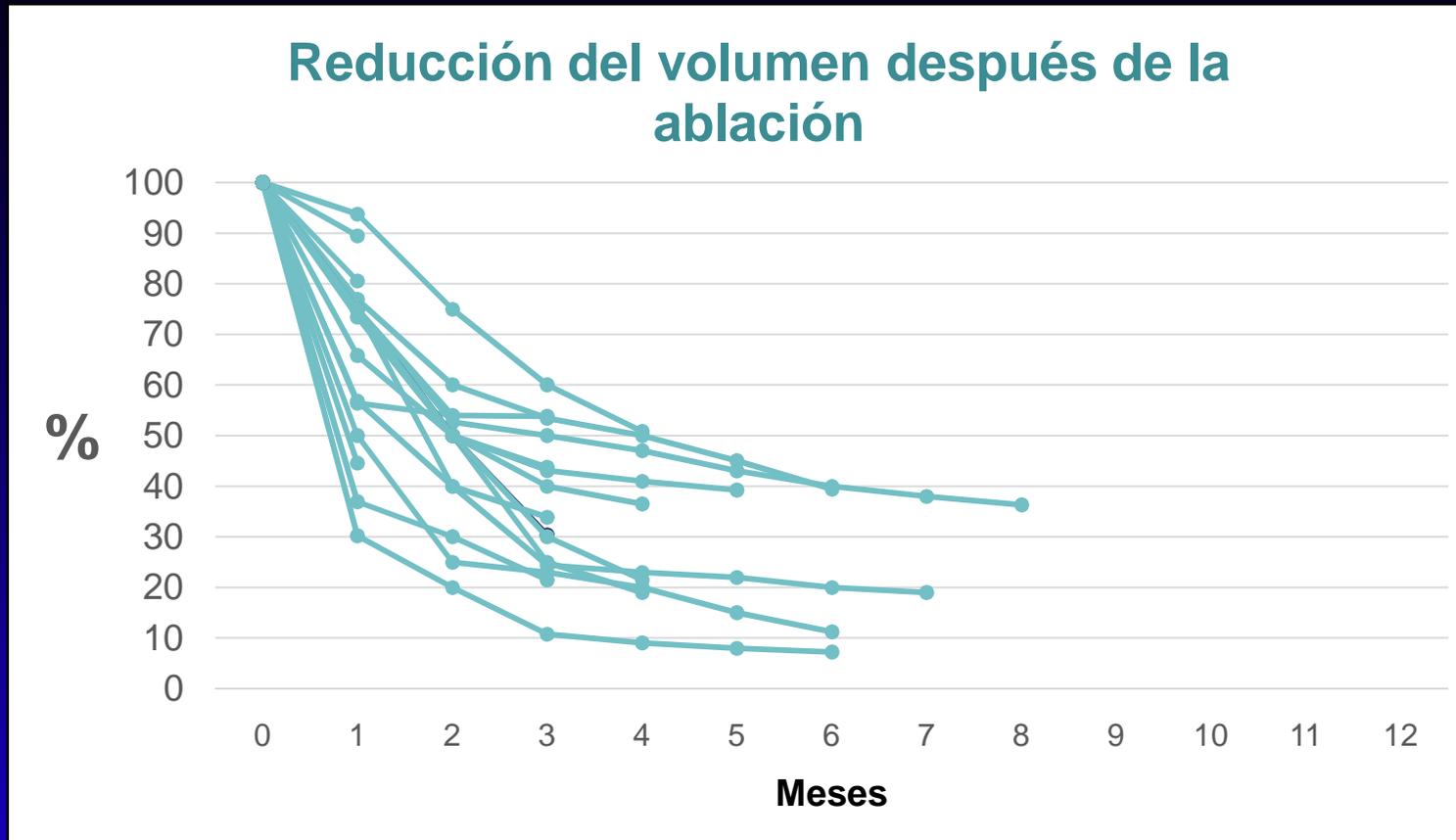
50 meses
3,2 cm. a 2 mm.



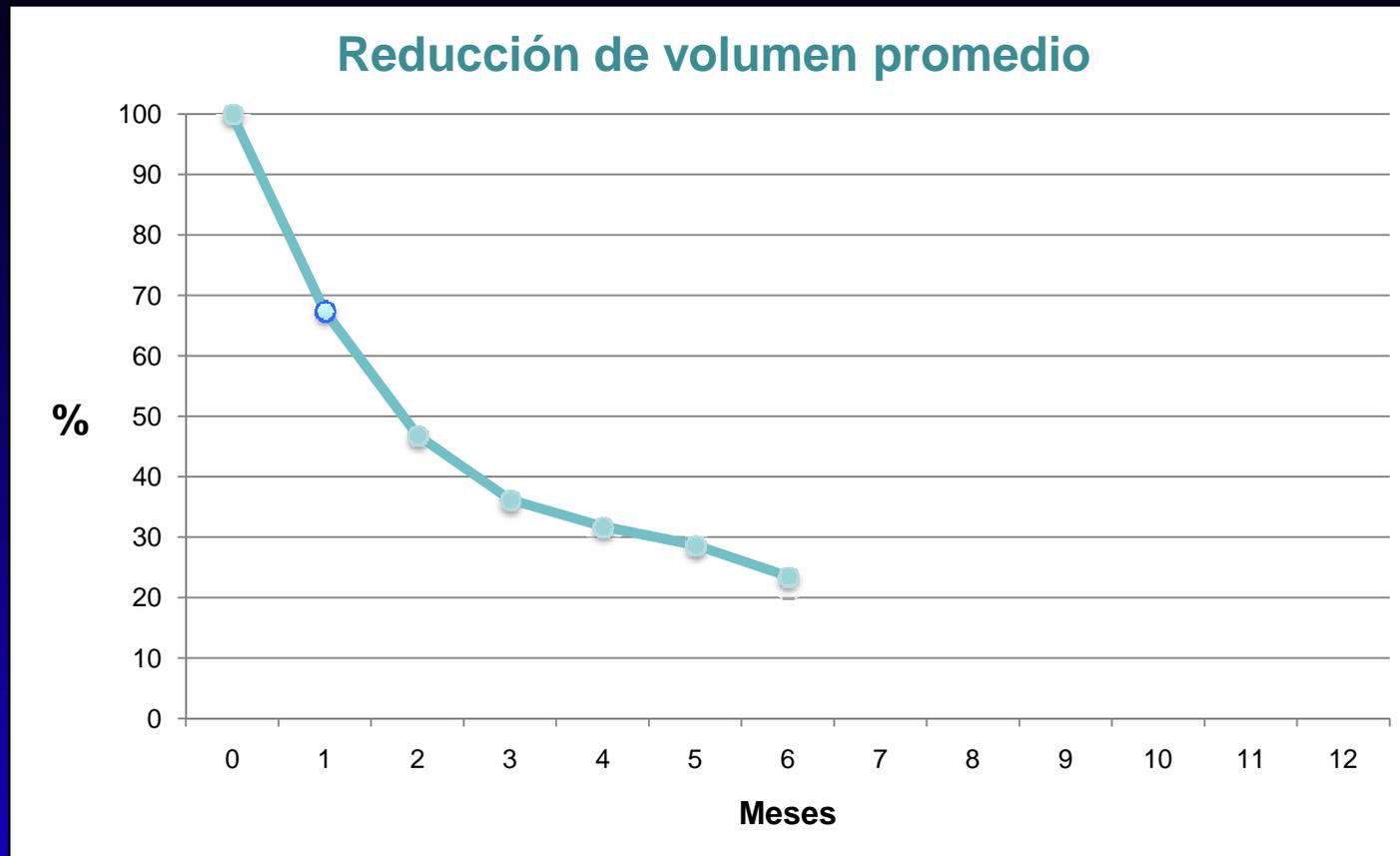
Resultados (HVH-HQT)

- 26 pacientes.
- 22 mujeres y 4 hombres.
- Anestesia local. (Sedació conscient 1 pacient)
- 16 nódulos derechos y 10 nódulos izquierdos
- Diámetro: 4 cm. (2,8 – 6,5)
- Volúmen: 17,9 cc. (3,2 – 97,5)
- Reducción de volumen:
 - 1 mes: 32,6 %
 - 3 meses: 63,8 %
 - 6 meses: 76,4 %

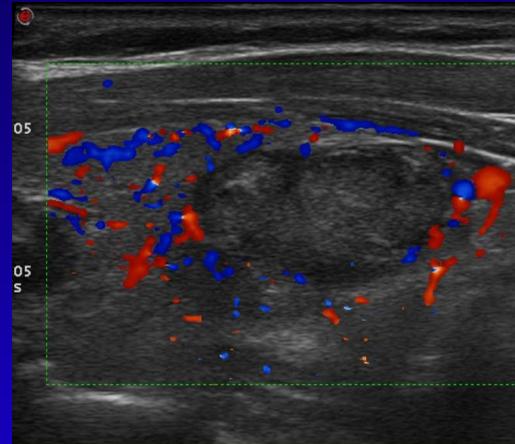
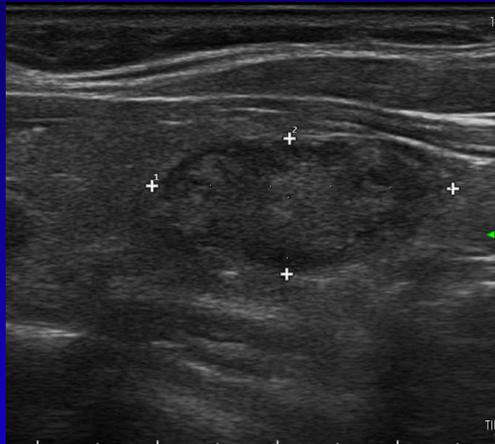
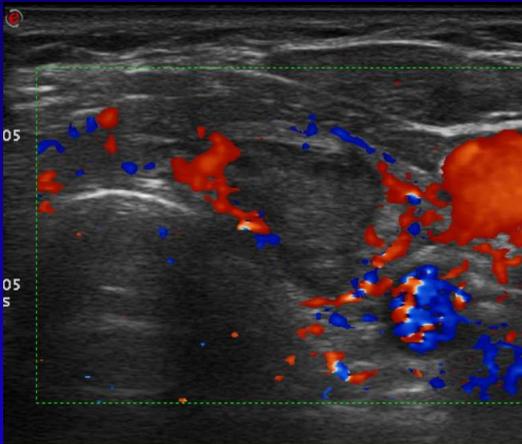
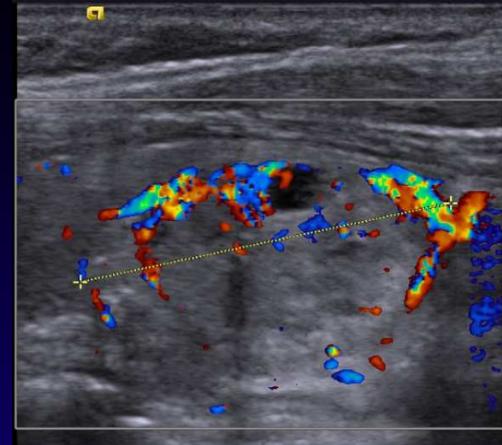
Resultados



Resultados

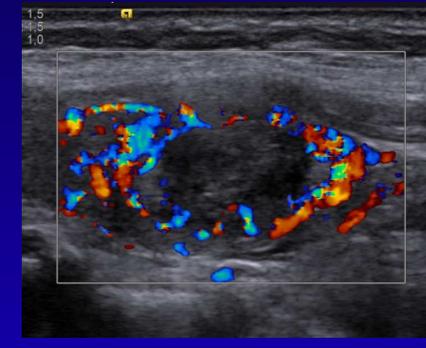
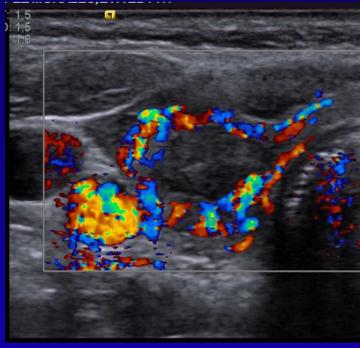
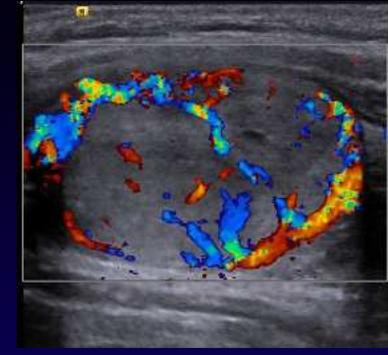
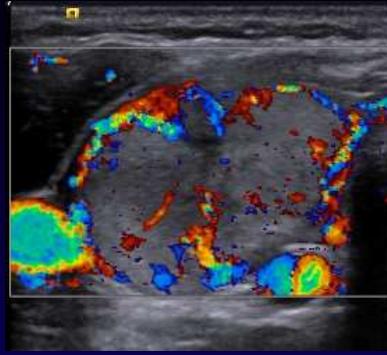


Resultados



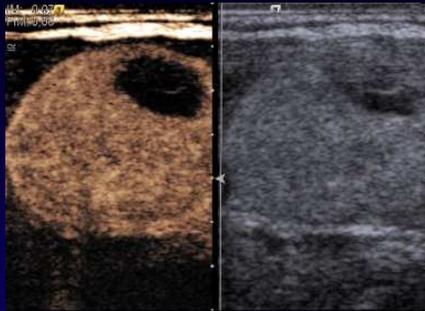
2 meses

Resultados

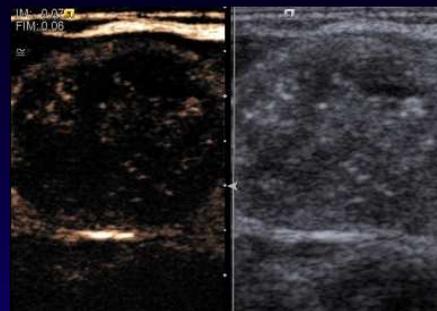


6 meses

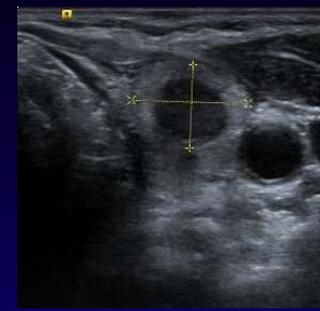
Resultados



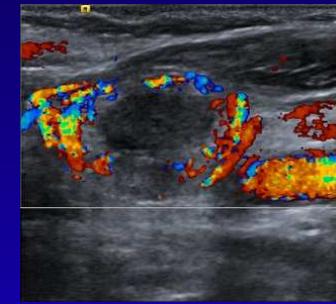
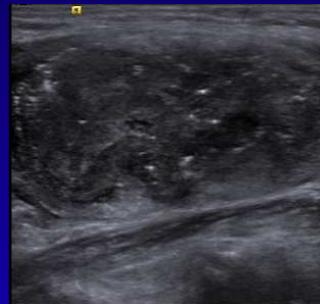
Pre-RF



Post-RF

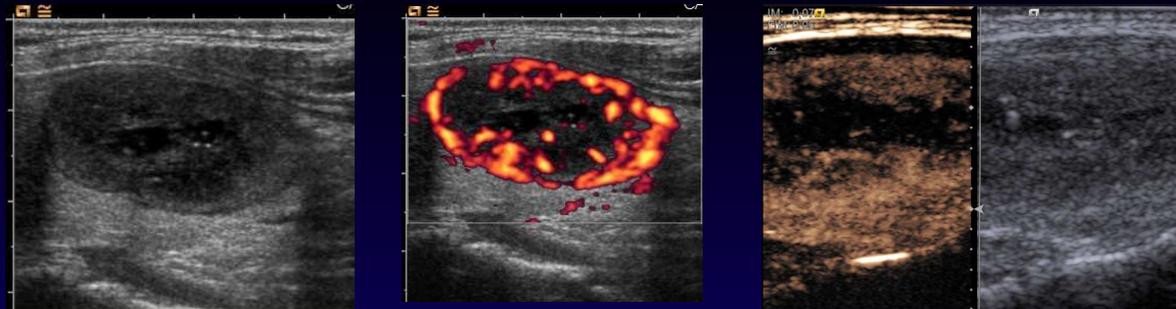


6 meses

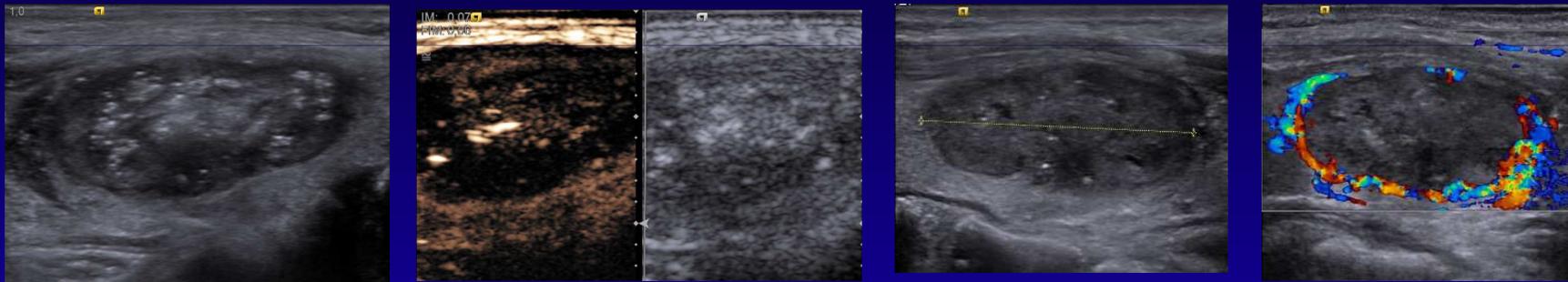


Resultados

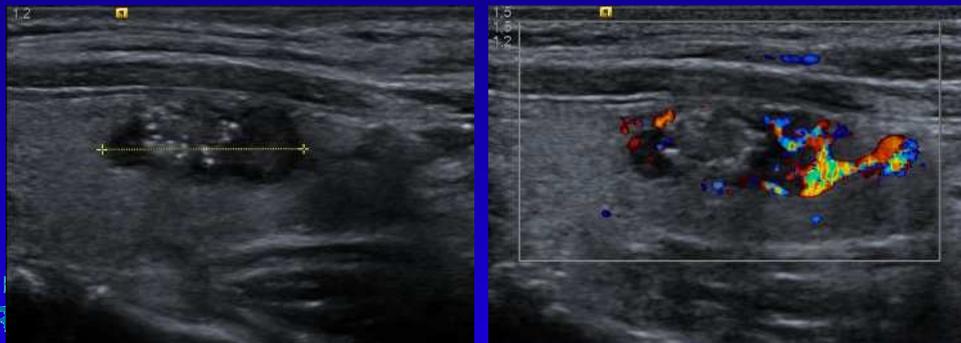
Pre-RF



Post-RF



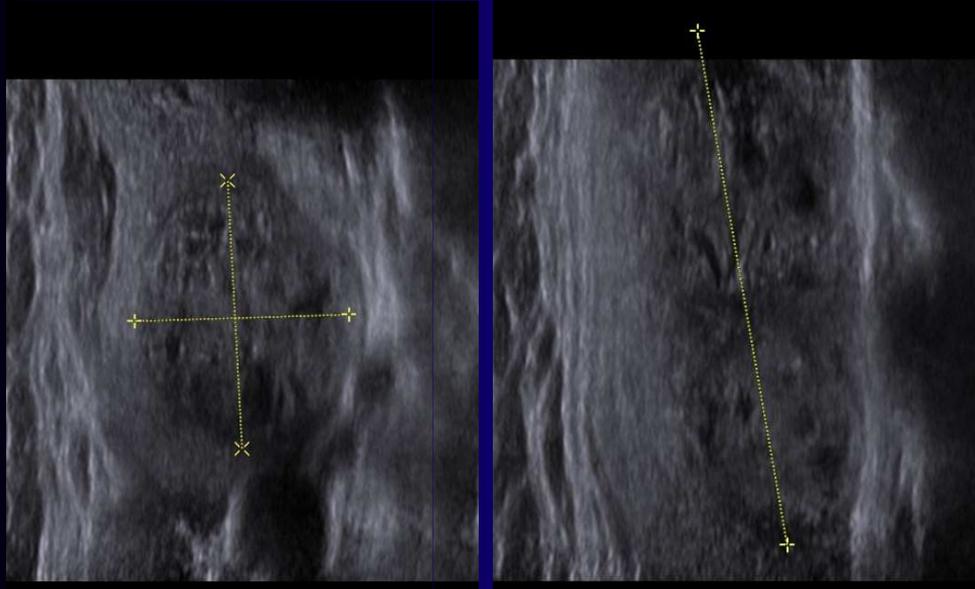
6 meses



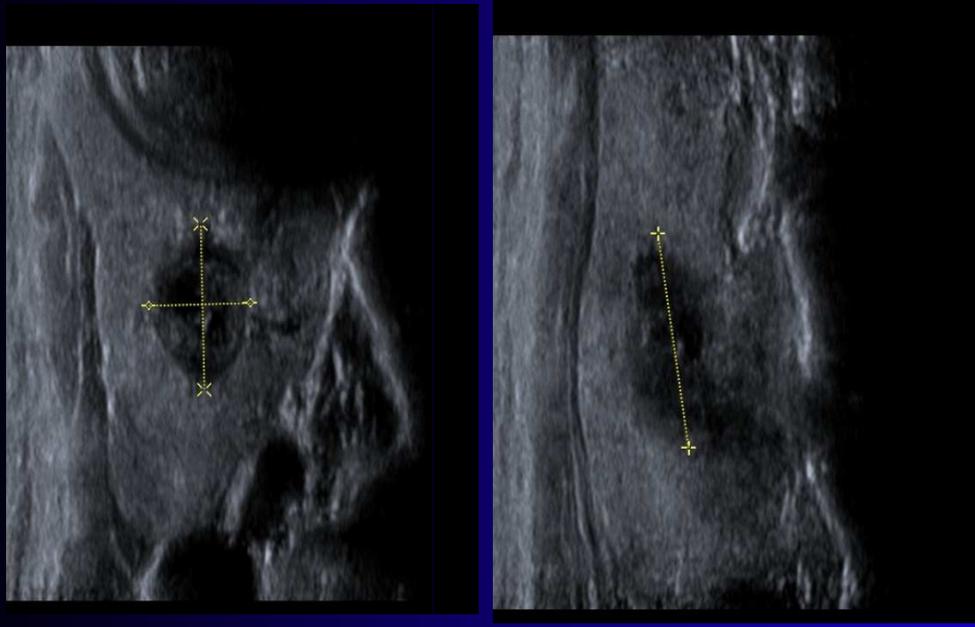
1 año



Resultados



Pre-RF

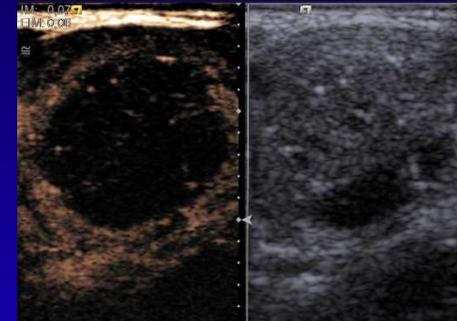
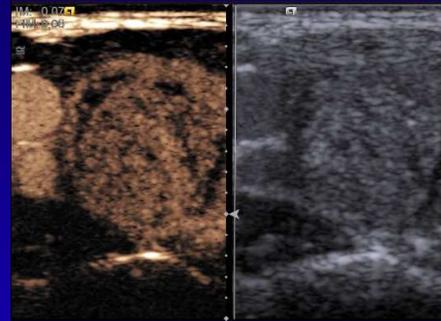


Post-RF

Resultados



Resultados



Resultados



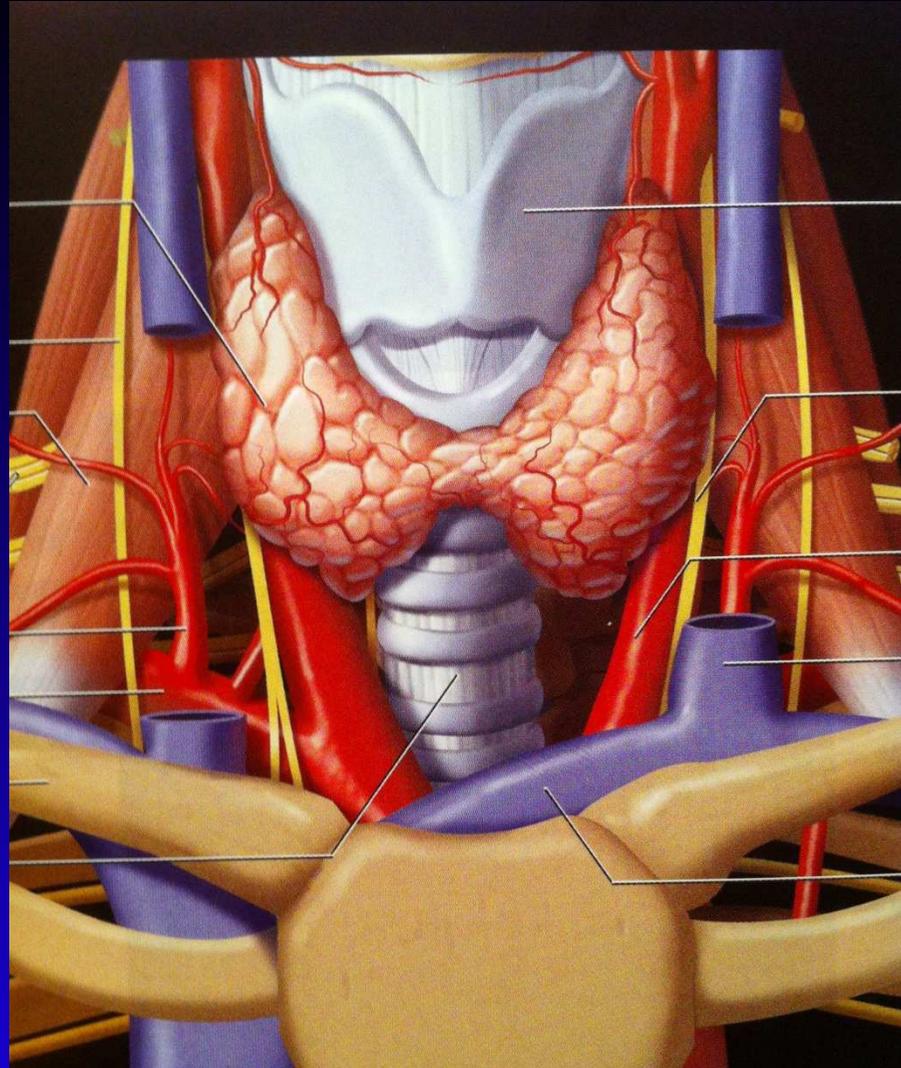
Complicaciones (HVH-HQT)

- Sangrado peritiroideo pequeño: 2
- Dolor que requiere analgesia: 1

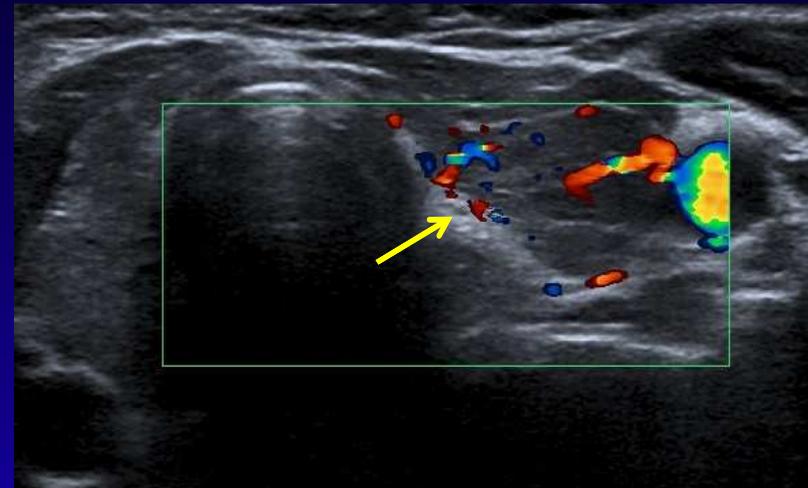
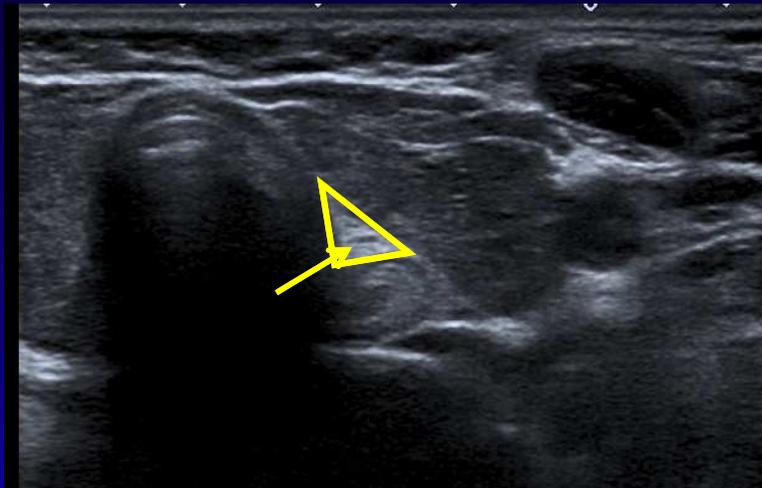
Complicaciones

- < 3%
- < 1,5% complicaciones mayores
- Dolor leve o moderado.
- Lesión del nervio recurrente.
- Lesión del ganglio simpático cervical.
- Hemorragia peritiroidea.
- Ruptura del nódulo.
- Vómitos.
- Lesión del plexo braquial.

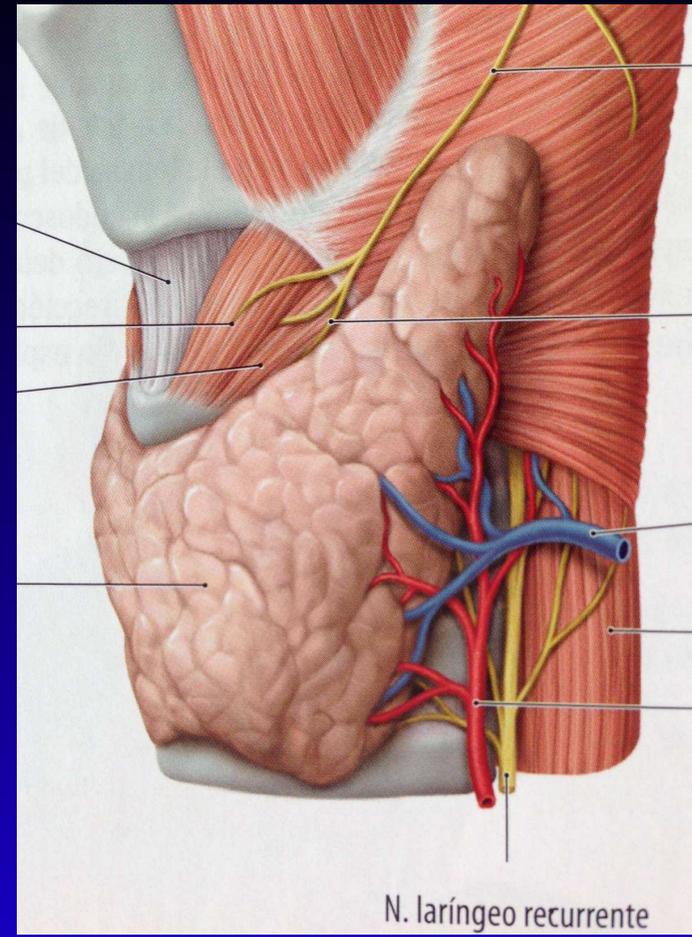
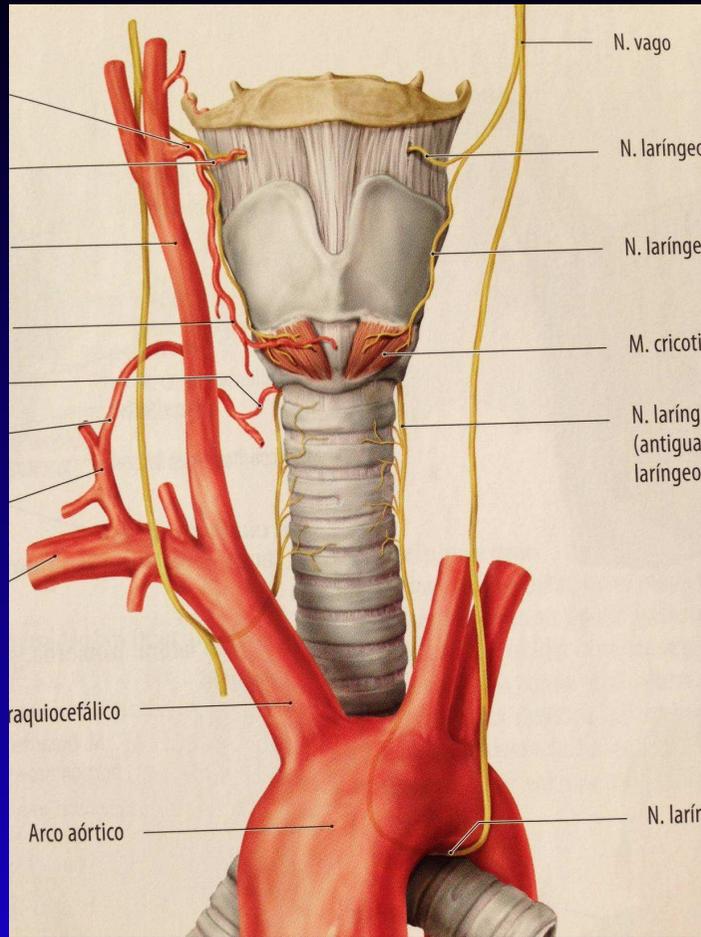
Complicaciones: Anatomía



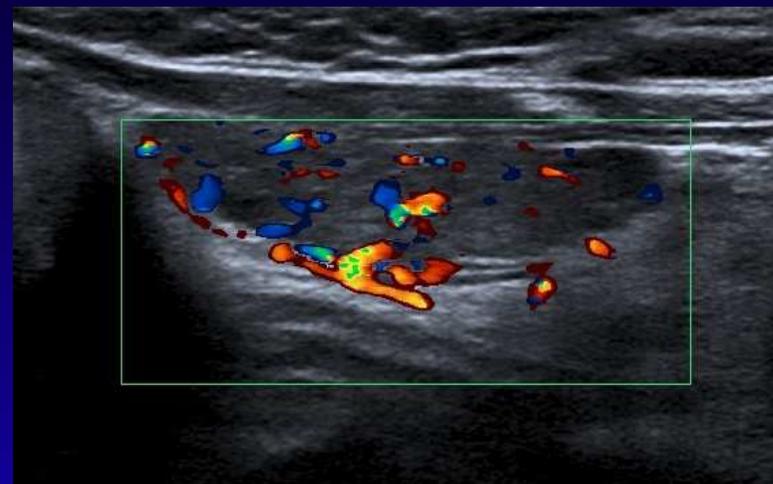
Complicaciones



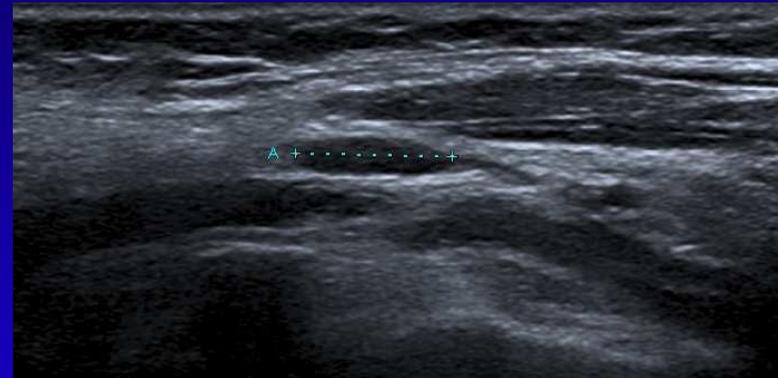
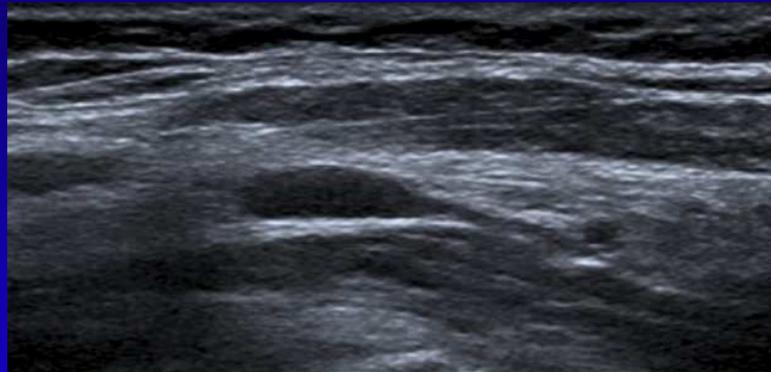
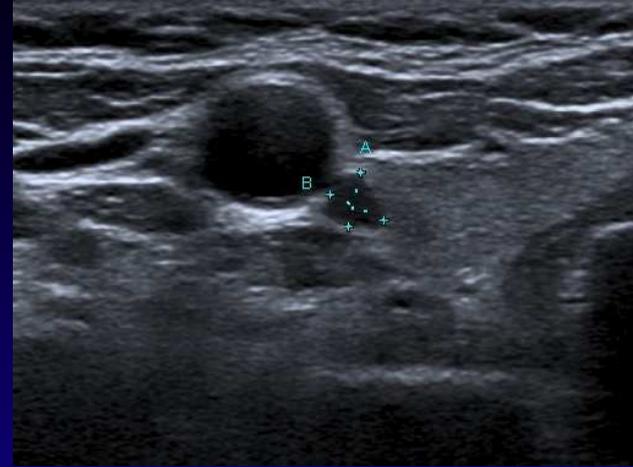
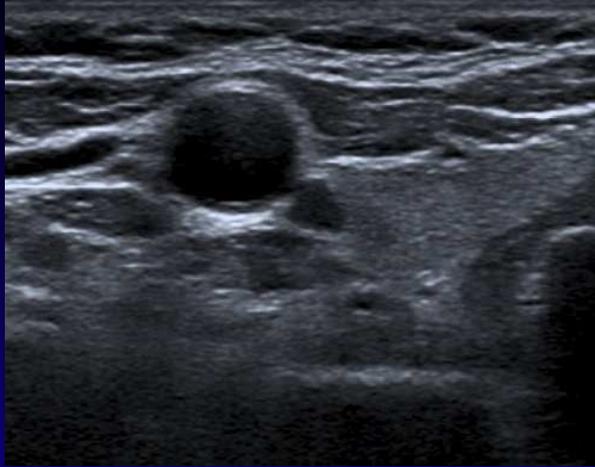
Complicaciones



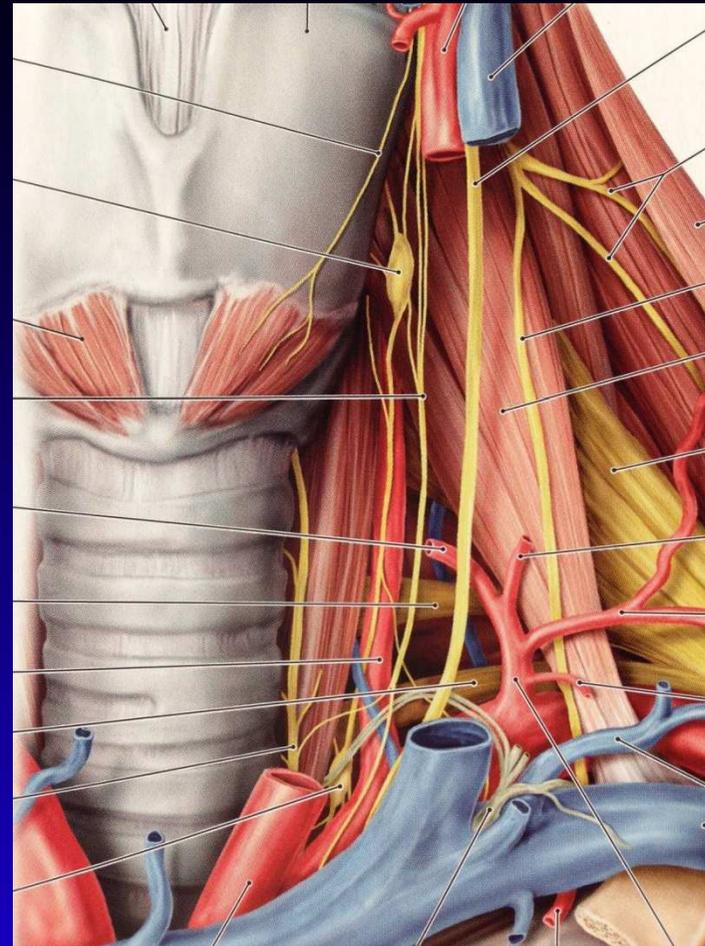
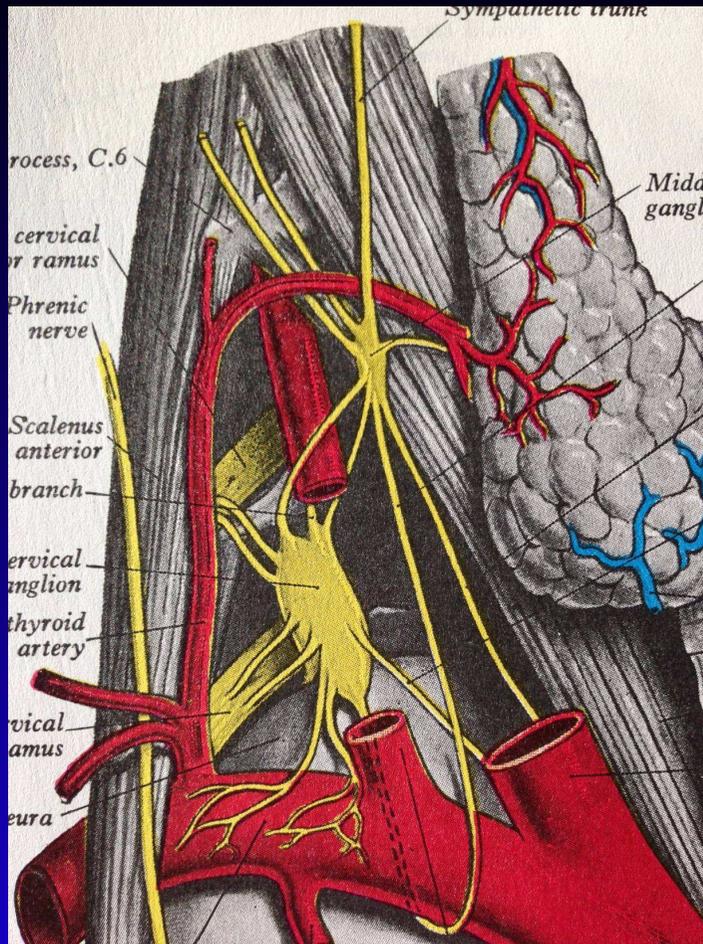
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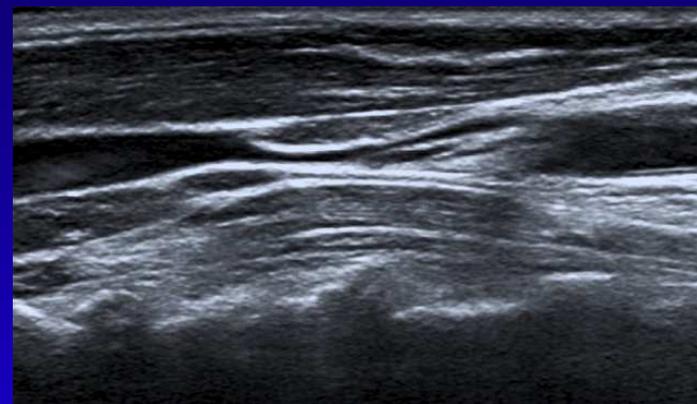
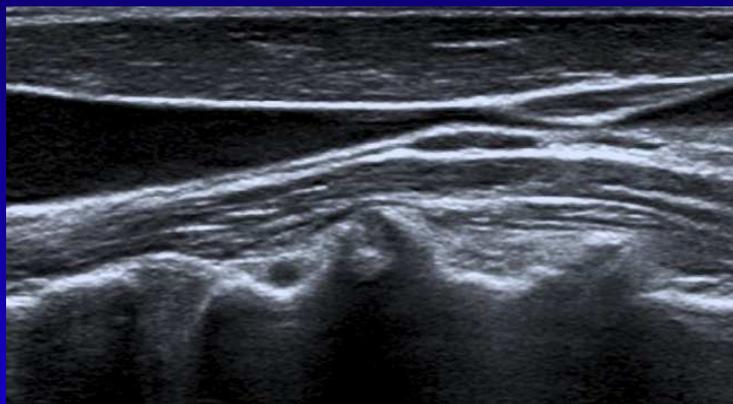
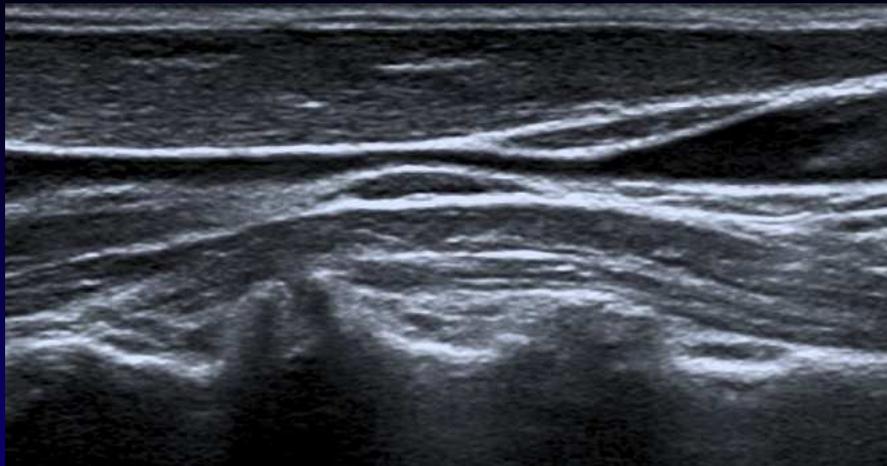
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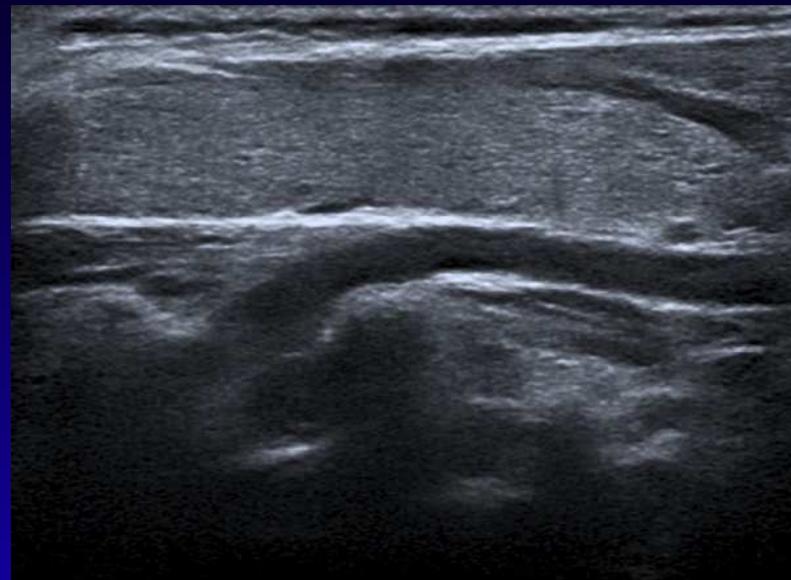
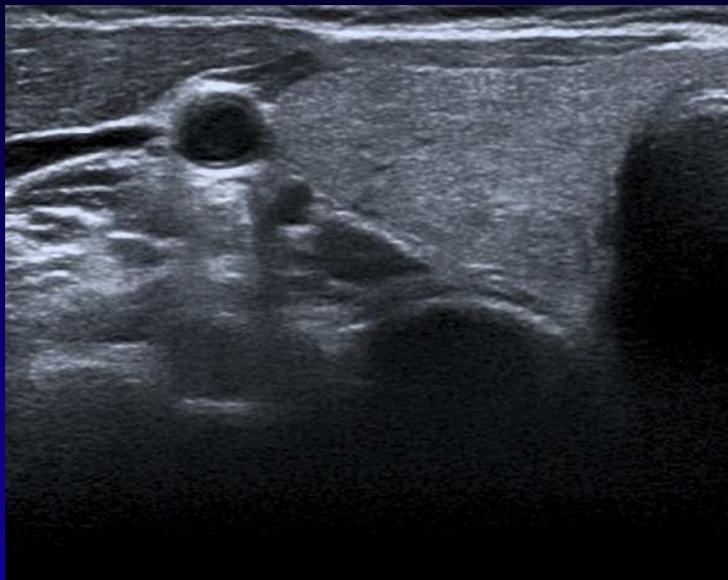
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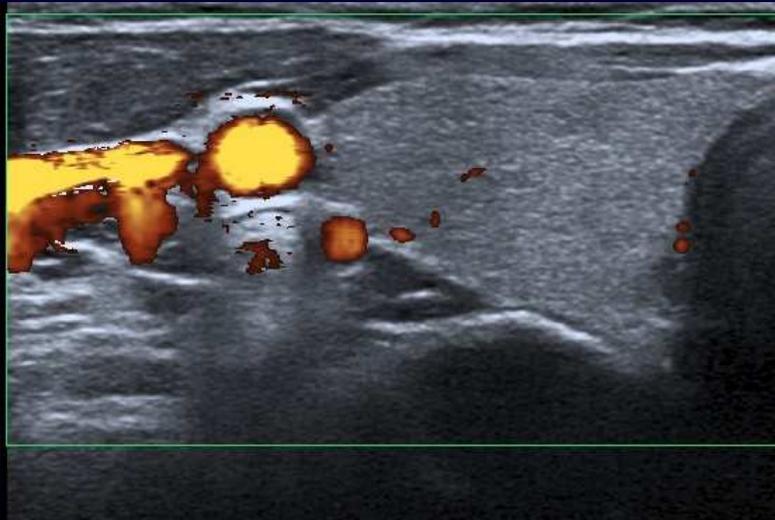
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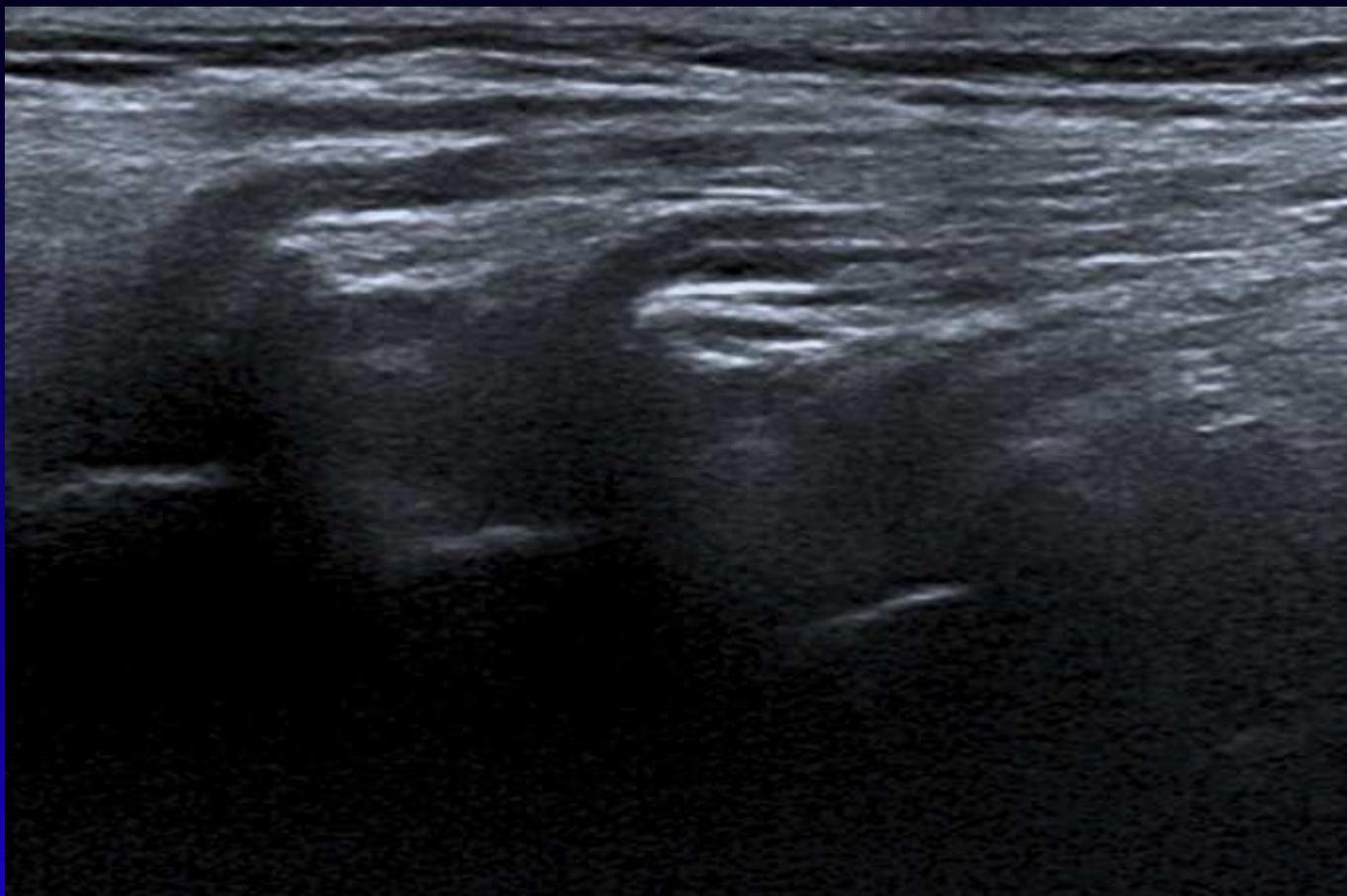
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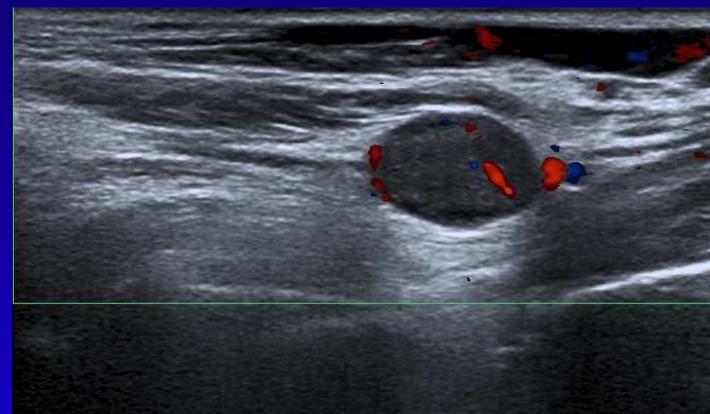
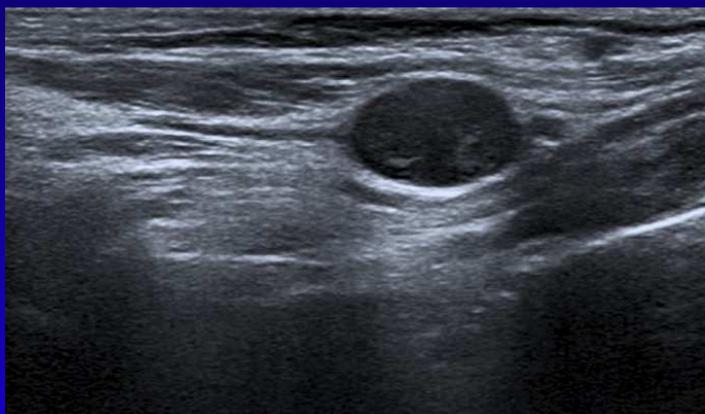
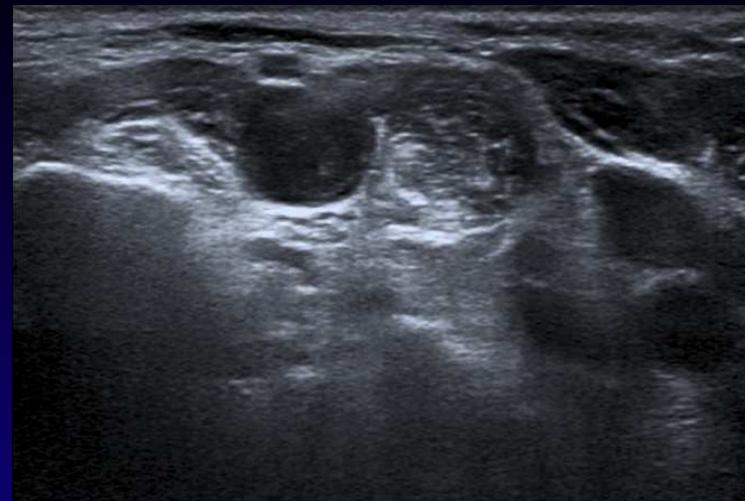
Complicaciones



Complicaciones



Complicaciones



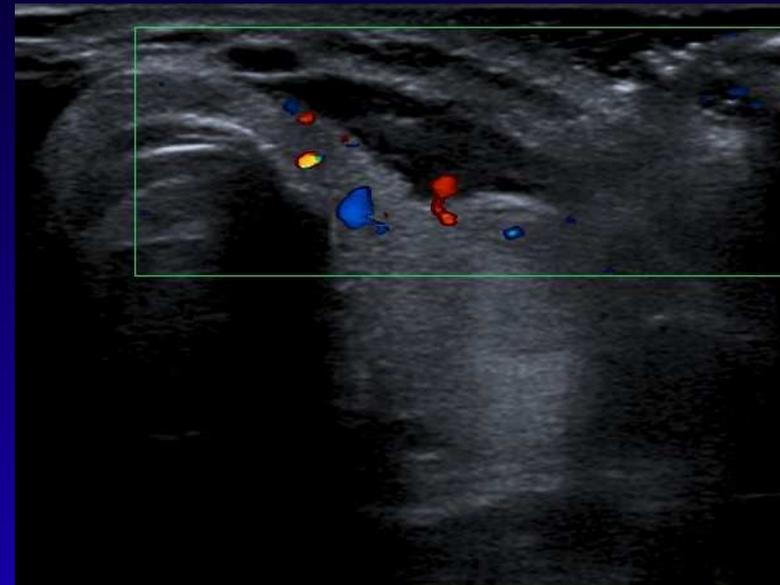
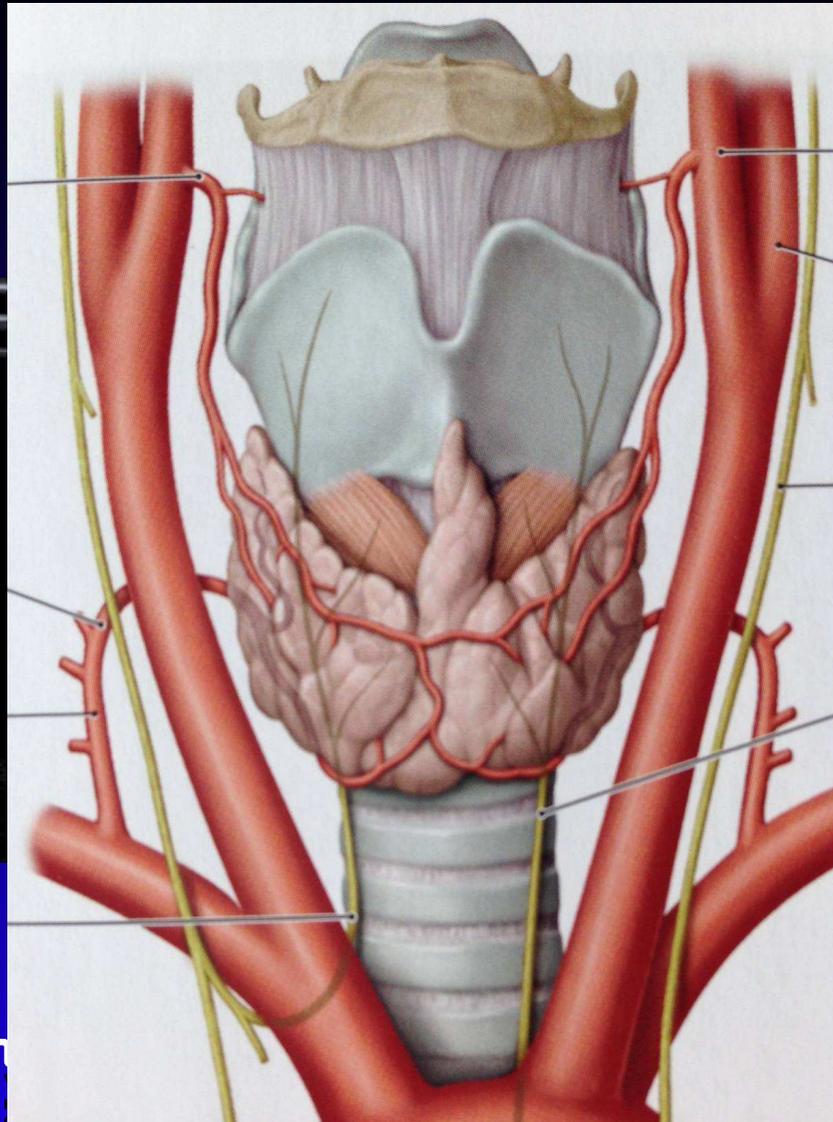
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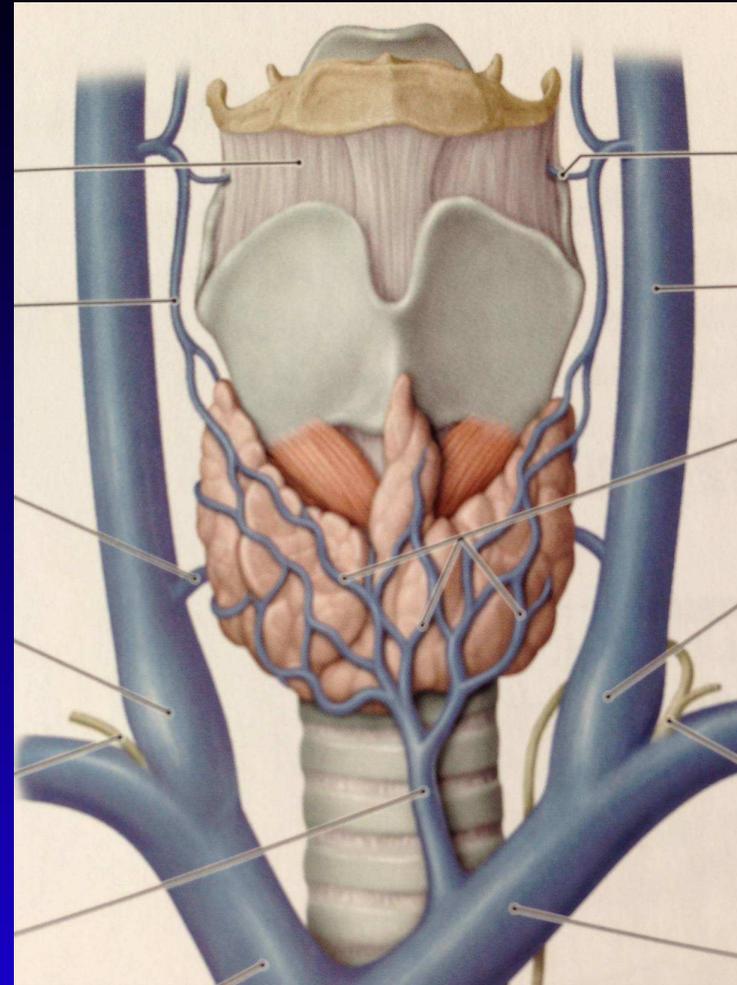
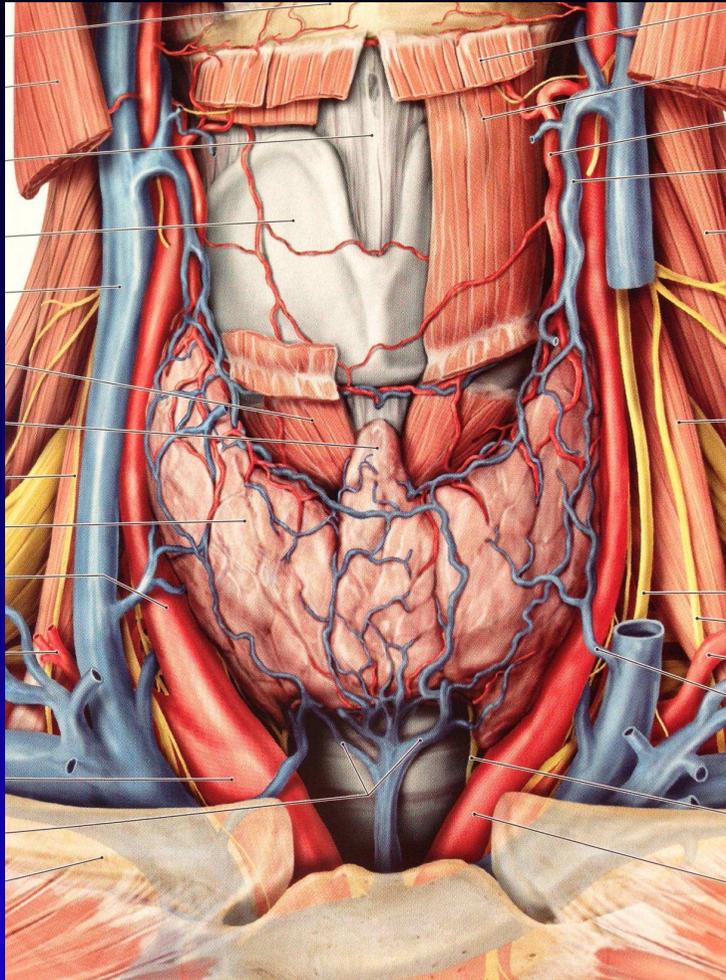
Hospital
General

TEKRON

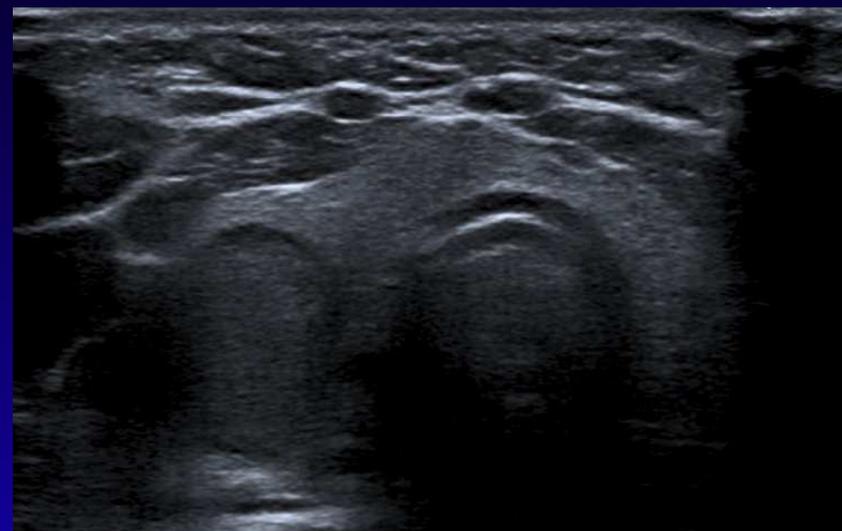
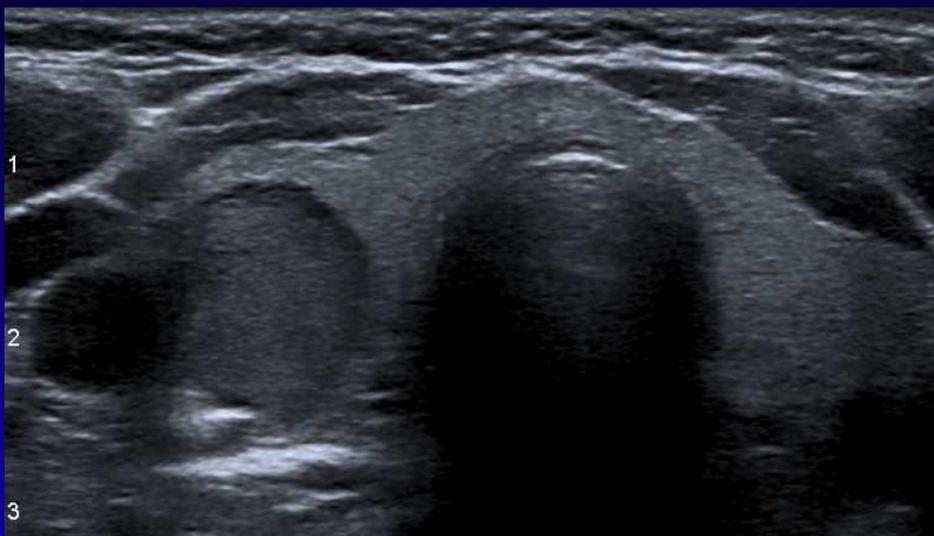
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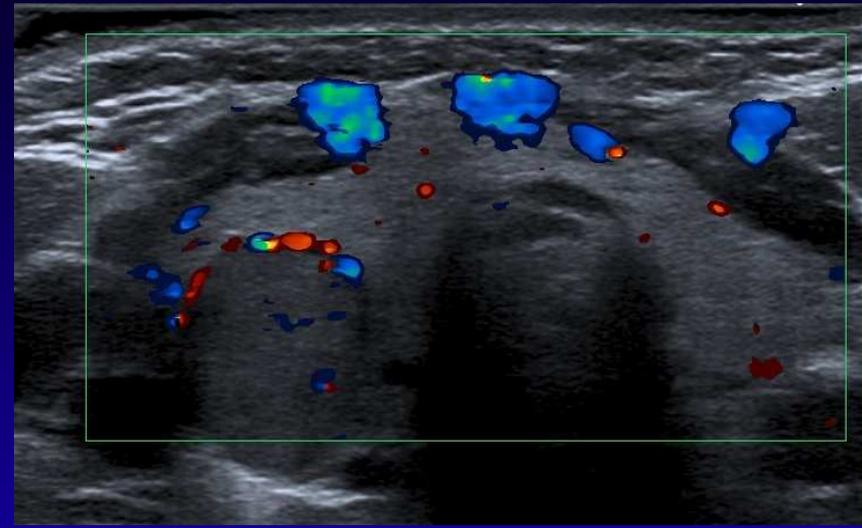
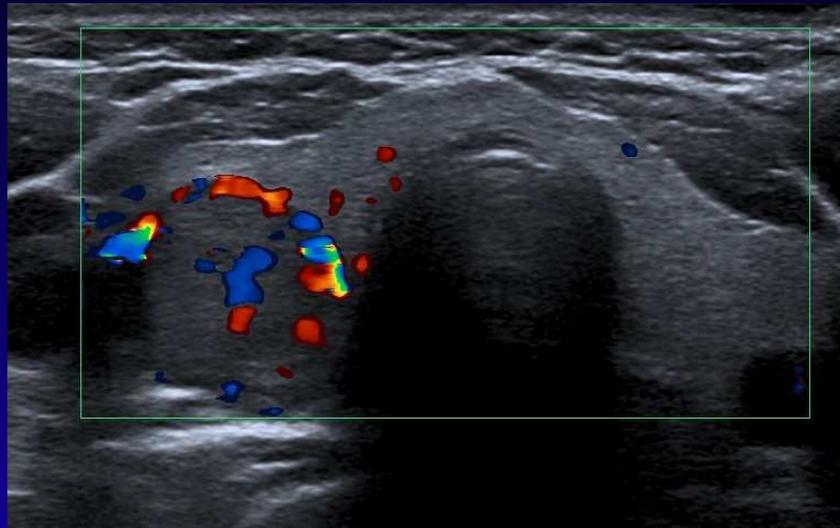
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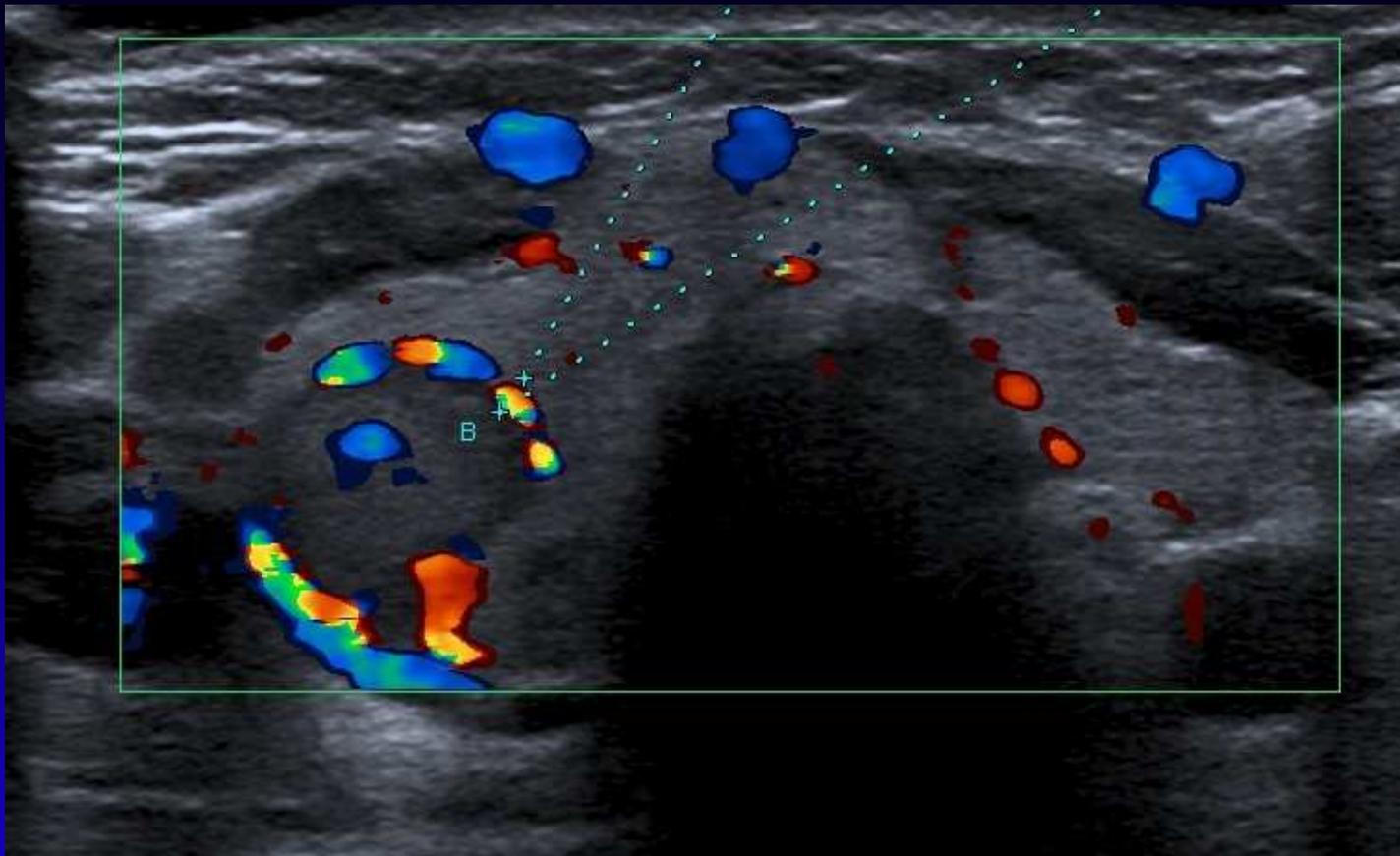
Complicaciones



Complicaciones



Complicaciones



Futuras indicaciones y líneas de investigación

- Ablación de tumores malignos en pacientes no quirúrgicos.
- Ablación de ganglios metastásicos del carcinoma papilar de tiroides.
- Respuesta autoinmune inducida.
- Carcinogénesis inducida.

