

How I do it:

**Endoscopic removal of
colloid cyst**

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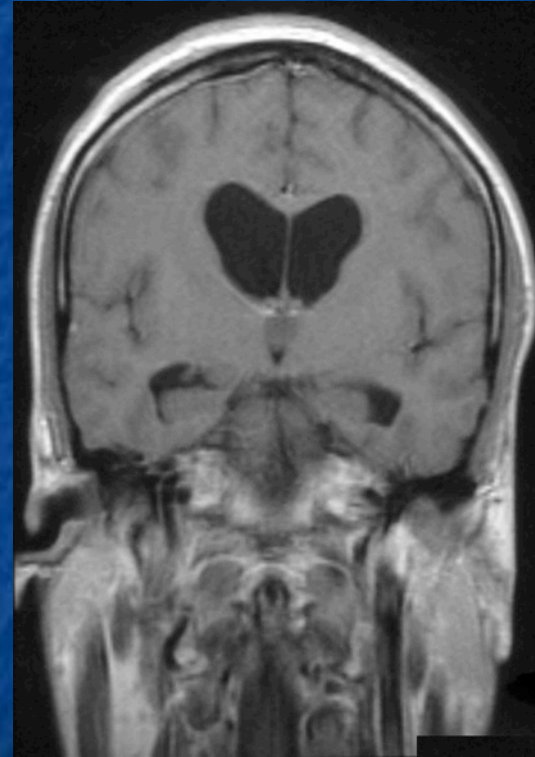
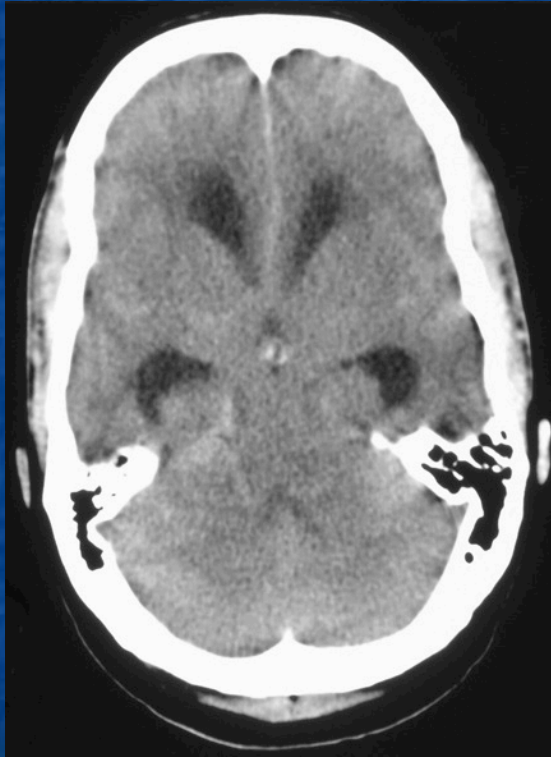
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Colloid Cyst

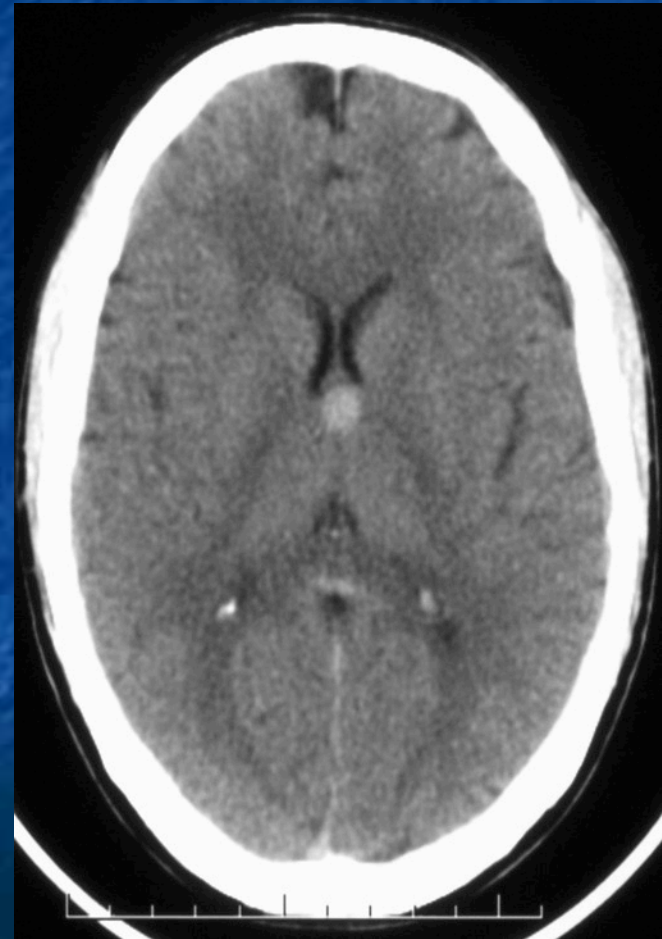
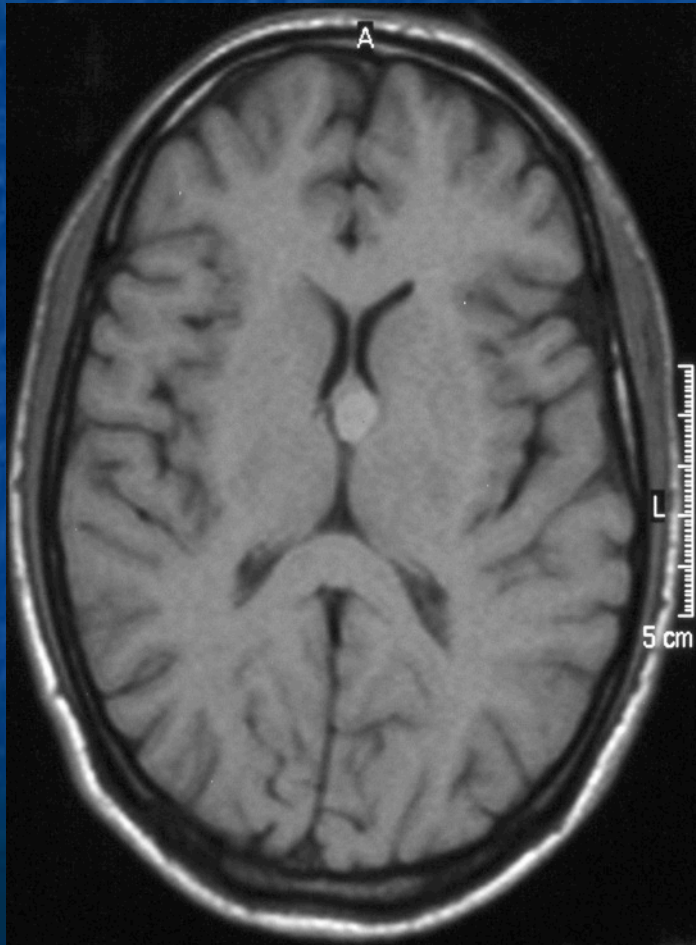
Treatment Options:

1. Observation
2. CSF diversion (bilateral shunts)
3. Craniotomy - a) transcallosal (3 routes)
- b) transcortical (2 routes)
4. Stereotactic aspiration
5. Endoscopic

Colloid cyst with Hydrocephalus



Colloid Cyst without Hydrocephalus



Colloid Cyst

CT characteristics :

- hyperdense: 70% ----- 90% difficult to aspirate
- isodense: 25%
- hypodense: 5% ----- 75% easy to aspirate

OVERALL 63% DIFFICULT TO ASPIRATE

Colloid Cyst

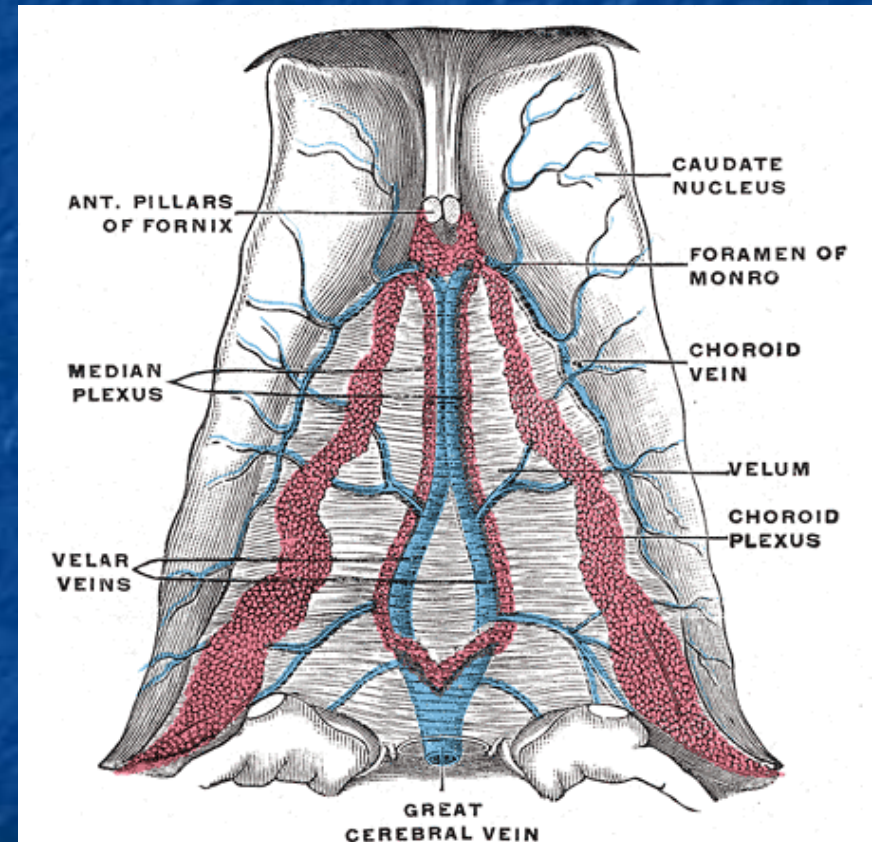
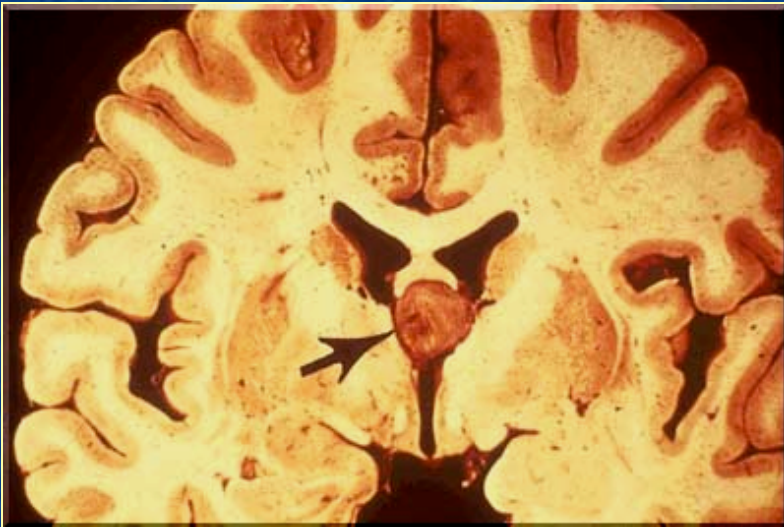
MRI characteristics :

- T2-weighted:

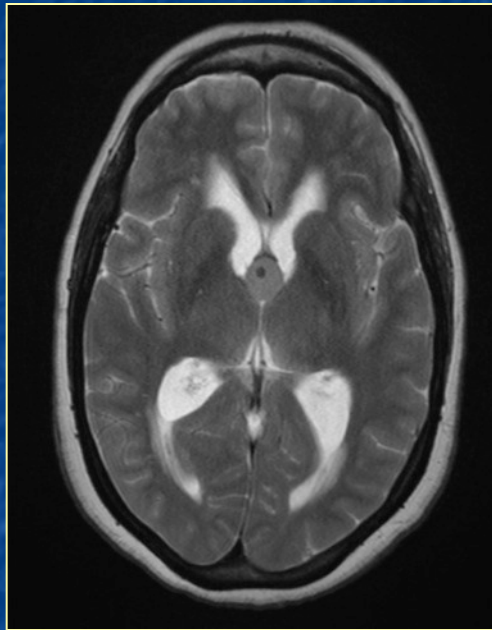
high signal ----- 63% easy to aspirate

low signal ----- 100% difficult to aspirate

Anatomy for Third Ventricle Colloid Cyst



Endoscopic Removal of Colloid Cyst



Step-by-step

- Position of patient
- Where to place the burr hole
- Which side
- Which endoscope
- Which instruments
- First endoscopic evaluation (size of foramen, visibility of cyst, choroid plexus and veins)
- Coagulation of the choroid plexus on the cyst wall
- Cutting the plexus off the cyst wall
- Opening of the cyst wall
- Partial emptying of the cyst
- Luxation of the remaining parts into the lateral ventricle
- Detachment from the tela and removal of cyst
- Final hemostasis and inspection of the aqueduct
- Closure

endoscopic removal of colloid cyst step-by-step

- Position of patient
 - Supine
 - Head flexed 20 degrees, otherwise neutral
 - Head fixed (vacuum pillow, skull clamp)



endoscopic removal of colloid cyst step-by-step

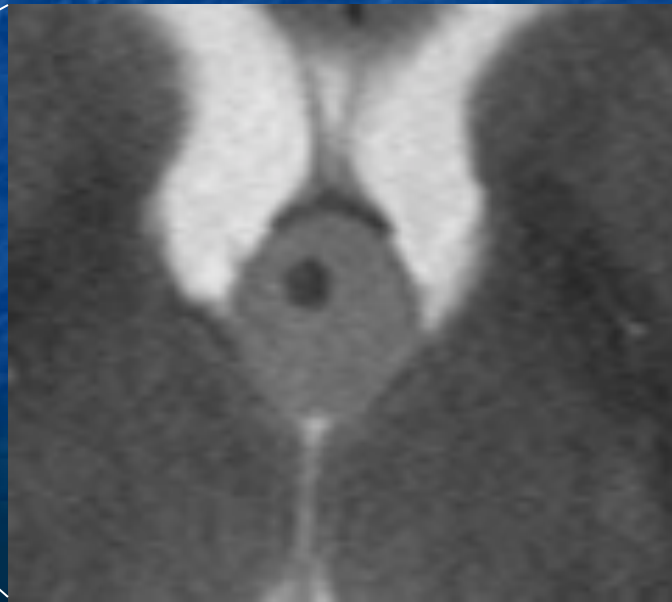
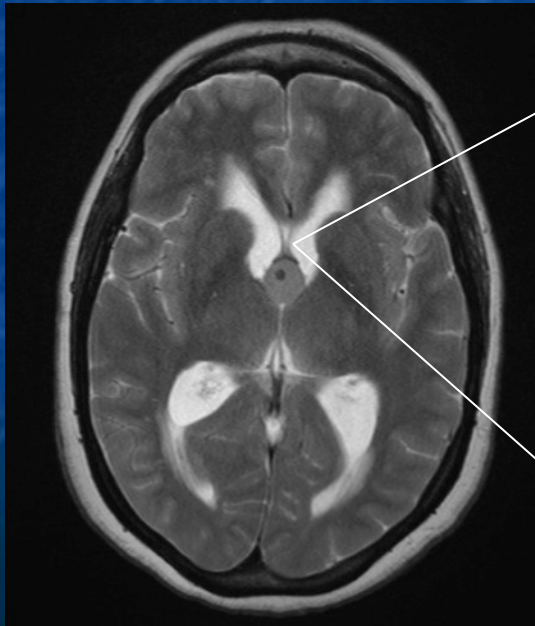
- Where to place the burr hole
 - Preferably use guidance (e.g. EM-navigation)
 - As a general rule, 9 cm from the nasion, 3 cm paramedian



endoscopic removal of colloid cyst

step-by-step

- Which side ?
 - Carefully study the CT and MRI to find out on which side the cyst bulges more into the foramen
 - Otherwise choose the side of the largest frontal horn if there is apparent asymmetry
 - If that is not the case, choose the non-dominant side



endoscopic removal of colloid cyst step-by-step

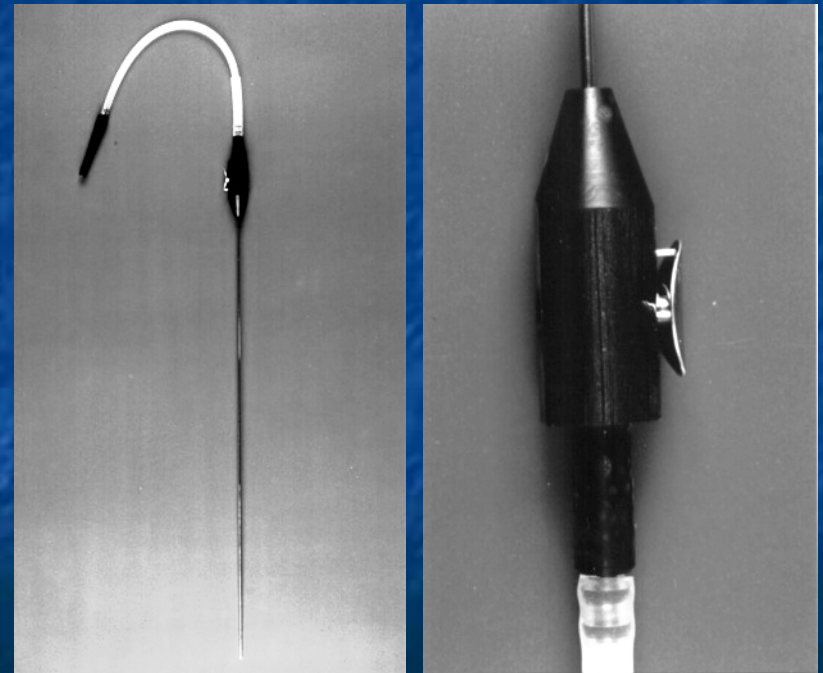
- Which endoscope ?
 - Preferable an endoscope with lenscope optic and take the one with the largest working channel
 - These endoscopes usually have a diameter of 6 mm and a working channel of 2 mm (this should be the minimum size of the working channel !)
 - If this is not available, use a rigid fiberscope, they come with 30.000 pixels and a 2.4 mm working channel
 - All others are not really suitable



Straight endoscope, eyepiece 90°
angled, either 0° or 30° optic

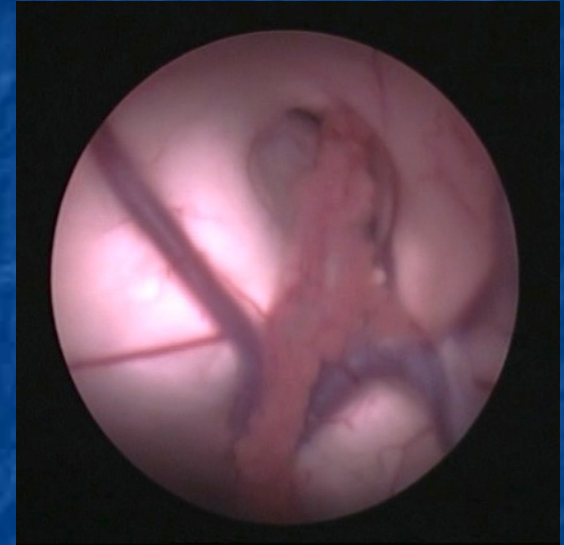
endoscopic removal of colloid cyst step-by-step

- Which instruments ?
 - Bipolar coagulation and/or laser
 - Grasping forceps (cup, sharp)
 - Scissor
 - Suction device (“perforator”)
 - Balloon catheter



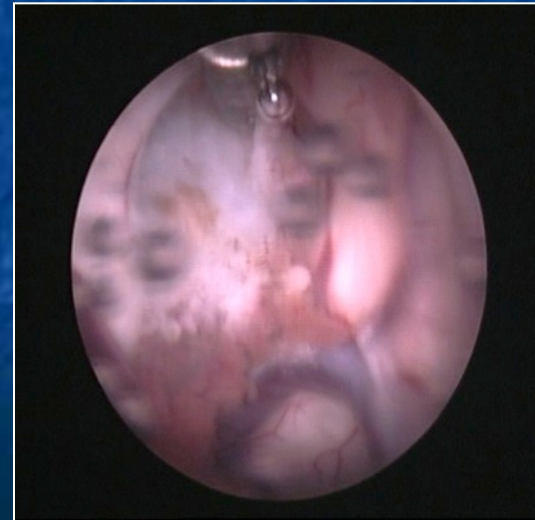
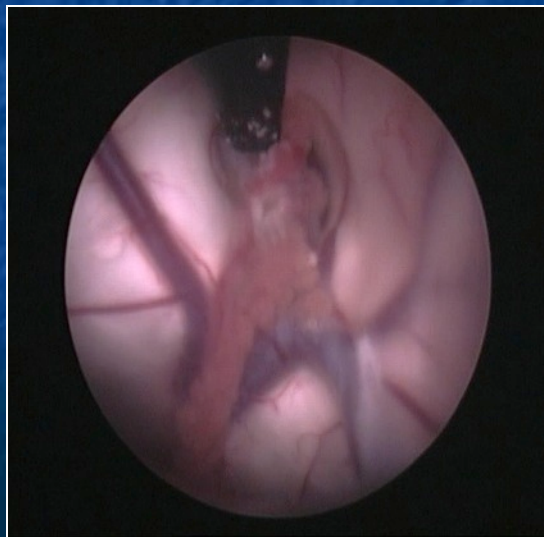
endoscopic removal of colloid cyst step-by-step

- First endoscopic evaluation (size of foramen, visibility of cyst, choroid plexus and veins)
 - How wide is the foramen ?
 - Is the cyst visible ?
 - If not visible, the cyst is high in the roof and somewhat more posterior, pushing fornices laterally and downward (then change to open procedure or use endoscopic transeptal interforniceal approach)
 - Is plexus covering the cyst and how closely attached are the septal vein and the thalamostriate vein ?
 - How does the cystwall react on “probing” with rinsing or with instrument (firm?, pliable? pedunculated?)



endoscopic removal of colloid cyst step-by-step

- Coagulation of the choroid plexus on the cyst wall
 - Start at the top towards the middle part of the cyst, not too close to the veins
 - Use low energy with bipolar
 - Have longer contact with the plexus by gentle movements until bleaching of the plexus occurs



endoscopic removal of colloid cyst step-by-step

- Cutting off the plexus
 - Use sharp scissor to cut the coagulated plexus (which is pushed into the foramen from the 3rd ventricle)
 - “scrape” remaining parts of the cyst wall with blunt instrument (e.g. closed cup forceps)

endoscopic removal of colloid cyst step-by-step

- Partial emptying of the cyst
 - Coagulate small vessels on the cyst wall
 - Use the perforator with slight turning movements but yet without applying suction to get it into the cyst wall
 - If that is not possible, use sharp scissor to open the wall first

endoscopic removal of colloid cyst step-by-step

- Partial emptying of the cyst
 - Apply intermittent suction with the perforator and gently remove it from the cyst (then the content becomes visible, if it is very soft then spilling can occur now)
 - Don't remove the whole content yet, since it would make manipulation of the cyst wall more difficult



endoscopic removal of colloid cyst step-by-step

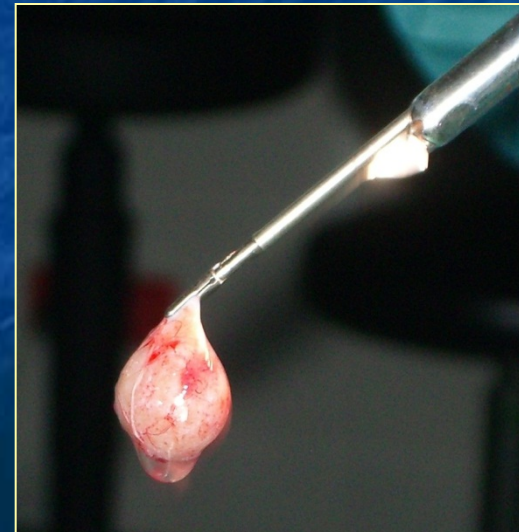
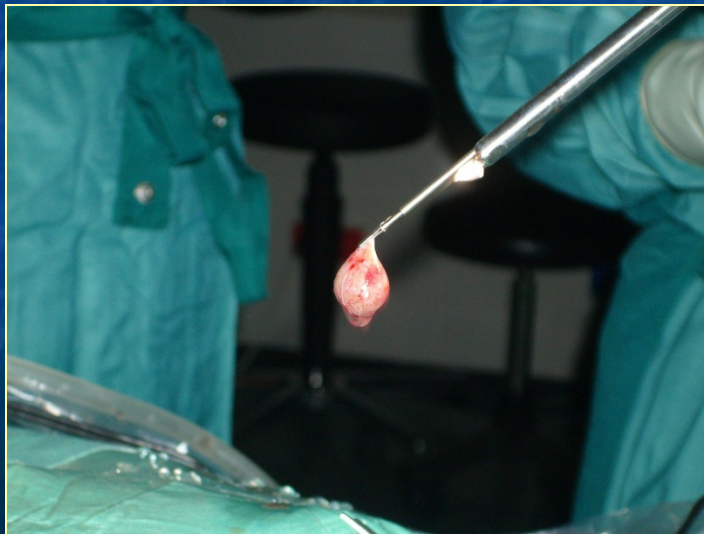
- Luxation of the remaining parts into the lateral ventricle
 - Grasp the cyst wall with forceps and first move laterally then backward followed by an upward movement
 - Let the cyst wall go back several times
 - Finally the cyst wall will detach from the tela
 - If the cyst wall is difficult to grasp and hold, place a balloon catheter into the third ventricle below the cyst wall and inflate it while grasping the cyst wall. The balloon will help in pushing the cyst out of the third ventricle
 - Due to these manipulations remaining content will come out now and then, the image will blur more and some venous oozing can occur so rinsing is essential in this phase

endoscopic removal of colloid cyst step-by-step

- Detachment from the tela and removal of the cyst
 - Finally the cyst wall will come out and lies in the foramen with the larger part of it.
 - Then coagulation and cutting of the attachment can be performed
 - If that is not the case repeat the previous movements of luxation until the cyst “ gives way” although this often causes somewhat more venous oozing that will blur the image further

endoscopic removal of colloid cyst step-by-step

- Detachment from the tela and removal of the cyst
 - The cyst cannot be removed through the working channel so it is removed by holding it close to the lens of the endoscope and then retract the whole endoscope



endoscopic removal of colloid cyst step-by-step

- Final hemostasis and inspection of the aqueduct
 - Re-insert the endoscope
 - If there is some bleeding stay close to the foramen and continue rinsing until bleeding stops
 - It can be helpful to insert the balloon catheter and inflate it gently inside the foramen of Monro to apply some pressure (since venous oozing is usually from tela and plexus)
 - At the end proceed with the endoscope through the foramen into the 3rd ventricle to check the aqueduct and to ensure that no debris or blood is obstructing the aqueduct

endoscopic removal of colloid cyst step-by-step

■ Closure

- I use a triangular shaped piece of gelfoam that is partly pushed into the cortical channel while its larger part is covering the burr hole.
- The burr hole can be closed using bone dust
- Pericranium and galea are closed carefully



