PEDIATRIC MINIMALLY INVASIVE SURGERY IN SOLID TUMORS

Tanh Nguyen TV, M.D.

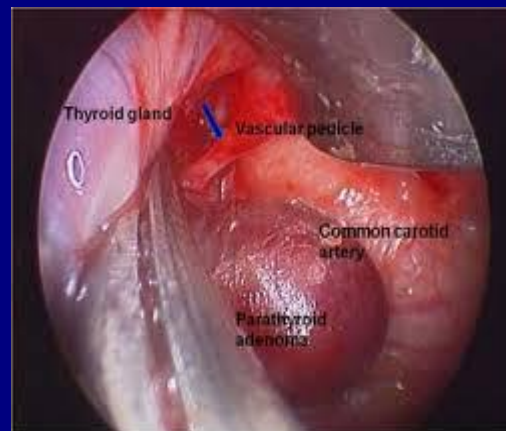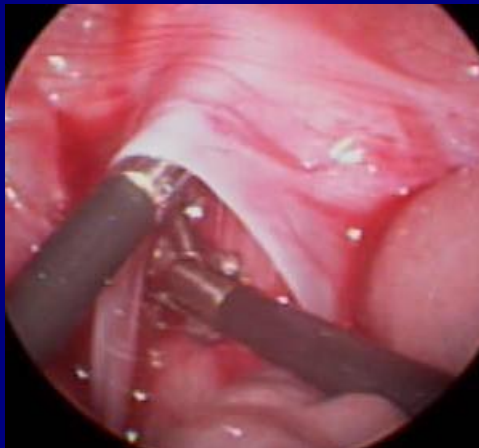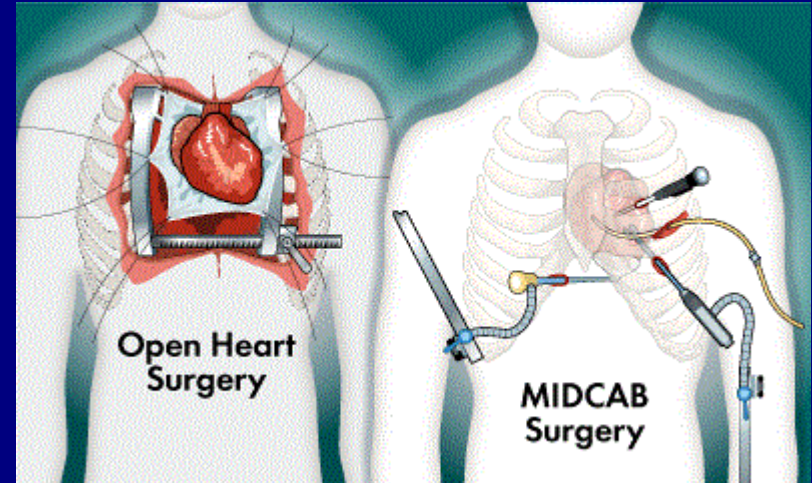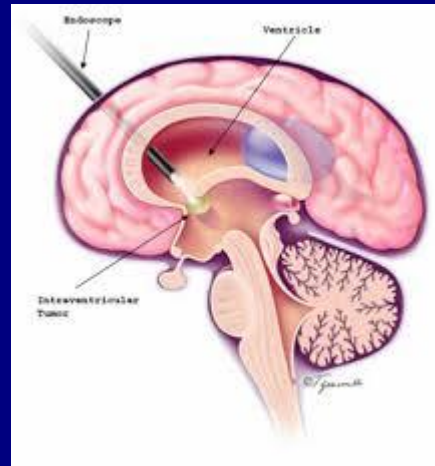Department of Gerneral surgery

Children's Hospital 2

Minimally Invasive Surgery

Large Operations with Tiny Incisions
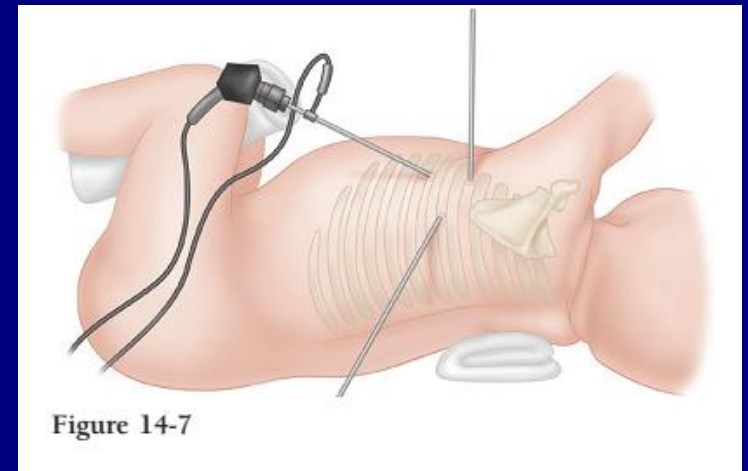
MIS-Advantages

* Cosmesis
  - open operations often leave large, unsightly incisions
  - with some laparoscopic instruments smaller than 2mm in size, it is often difficult to see incisions postoperatively

* Analgesia
  - Smaller incisions associated with less pain, lower analgesic use, and quicker recovery.
    - few controlled studies in children, especially in youngest patients

* Adhesions
  - several studies *suggest* the formation of fewer intra-abdominal adhesions after laparoscopic procedures
    - reduces the risk of future postoperative bowel obstructions
    - possibly reduces postoperative pain

* Decreased Ileus
  - Nissen, Appendectomy, Pyloromyotomy, Bowel resection, Spleen
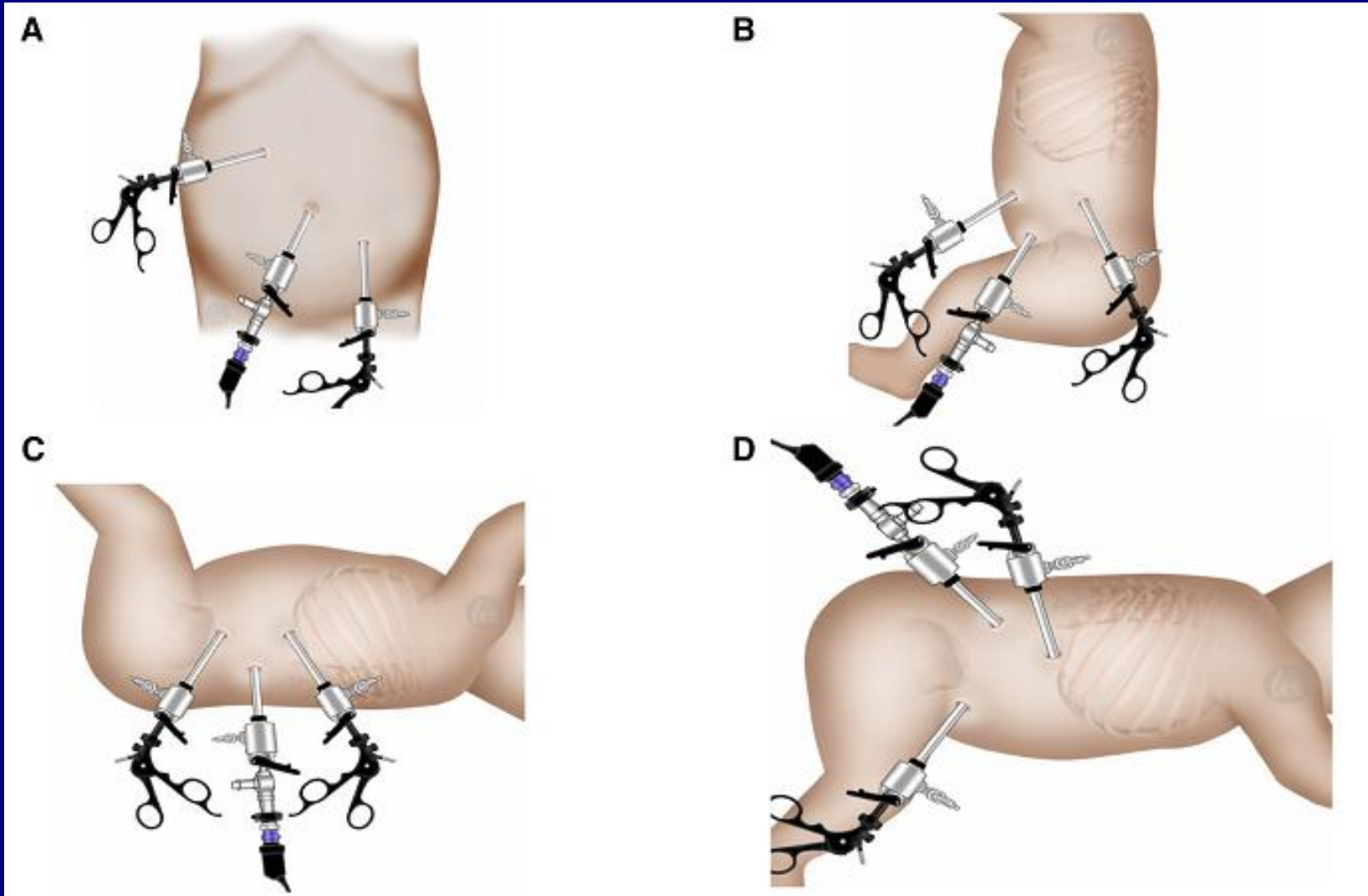 - Real or perceived?
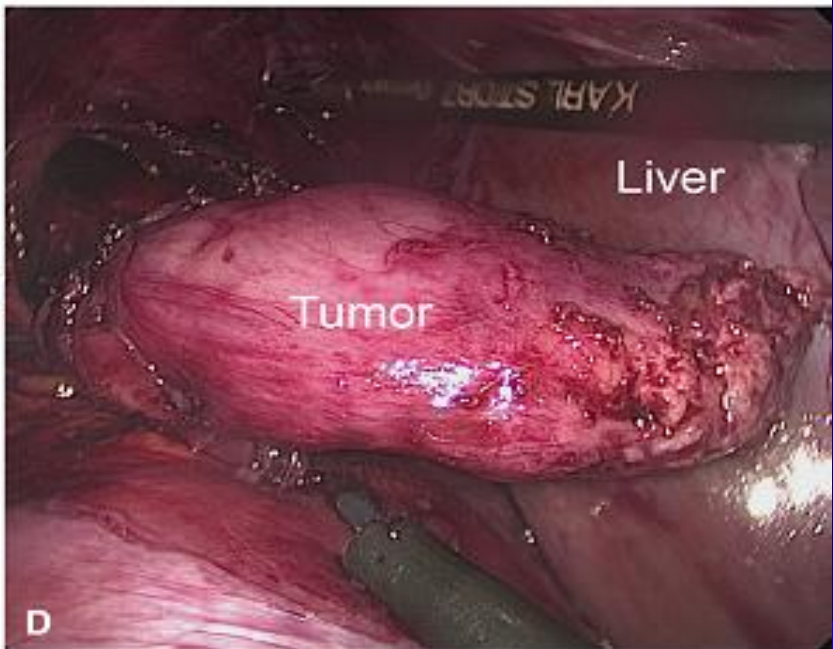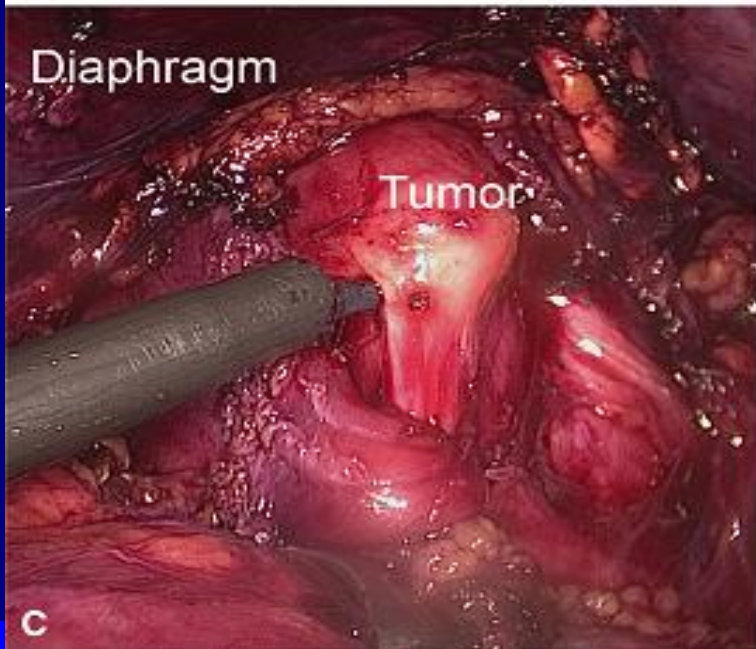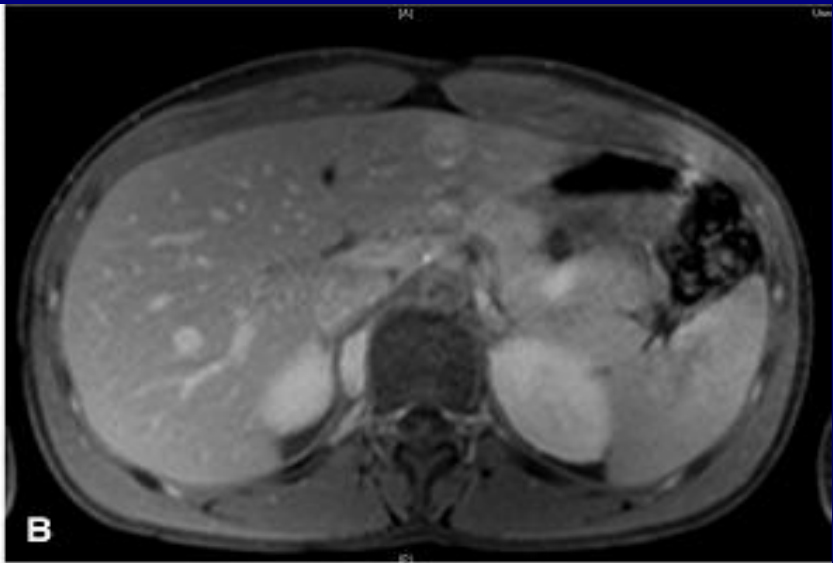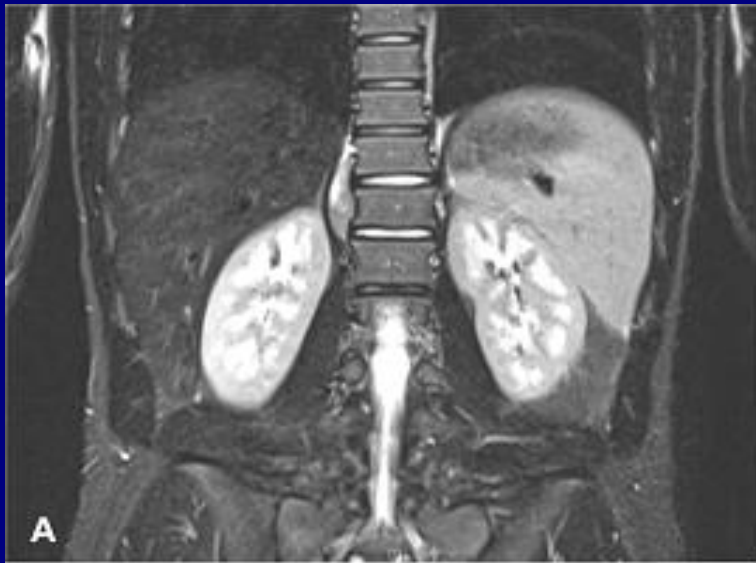
MIS - SOLID TUMORS

ABDOMINAL TUMOR

1. Neuroblastoma and adrenal tumors
2. Renal tumors
3. Germ cell tumors: Ovarian tumors
4. Pancreatic tumors
5. Liver tumors

THORACIC TUMOR

1. Thoracic neurogenic tumors
2. Lympho-proliferative diseases
3. Thoracic teratoma
4. Pulmonary metastases

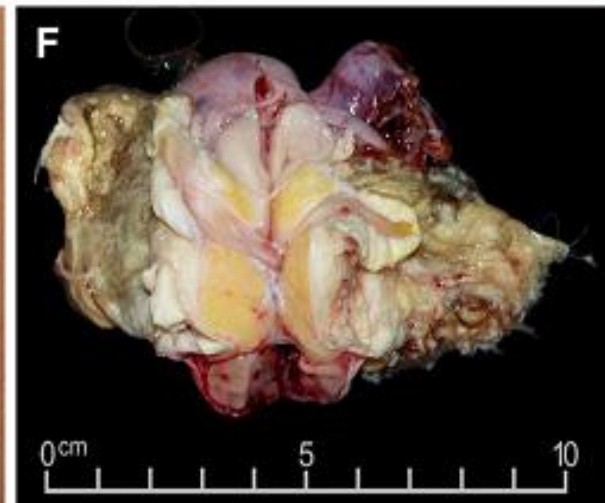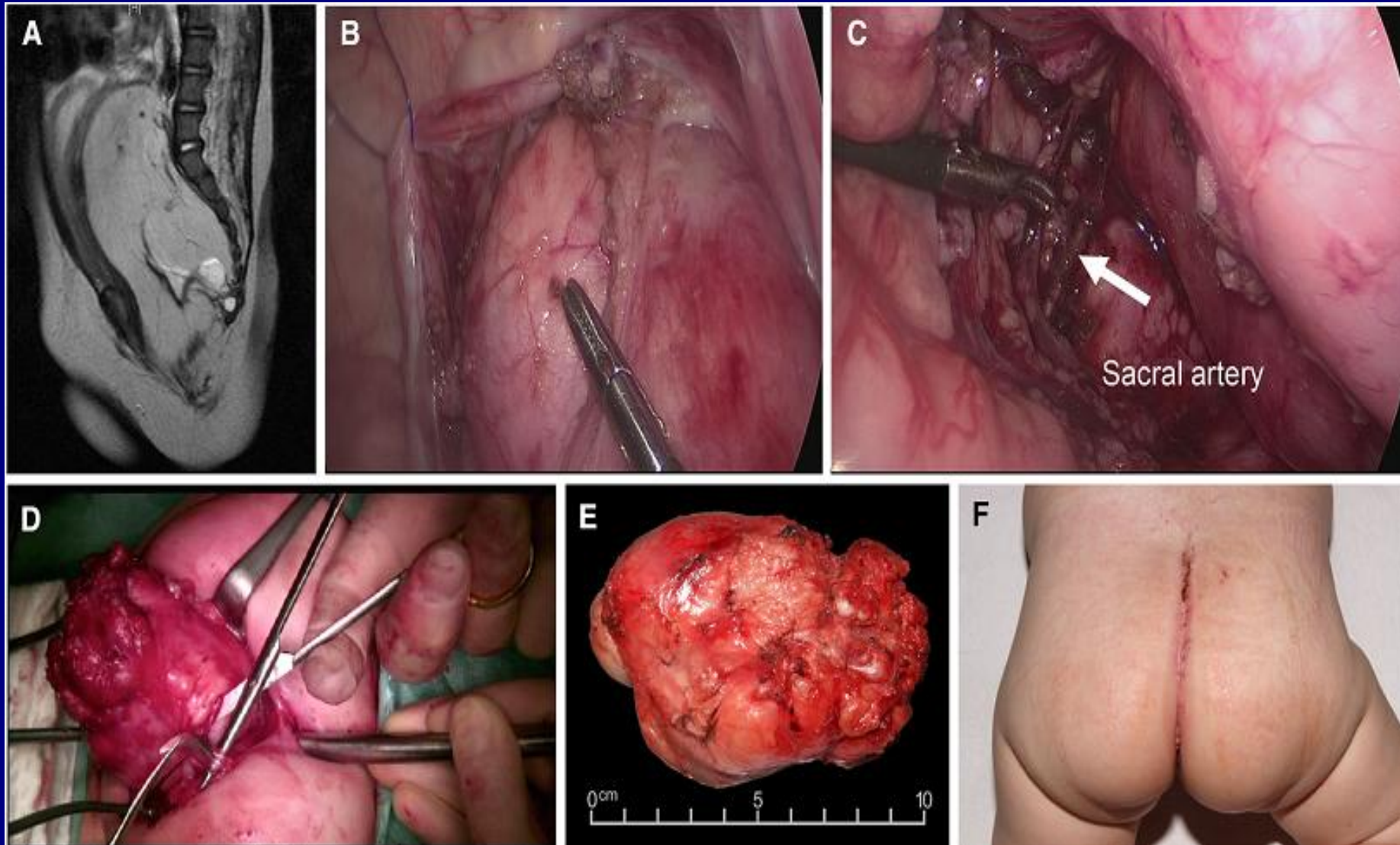# MIS approaches for adrenal tumors

A 5-year-old boy with neuroblastoma on the level of the diaphragm

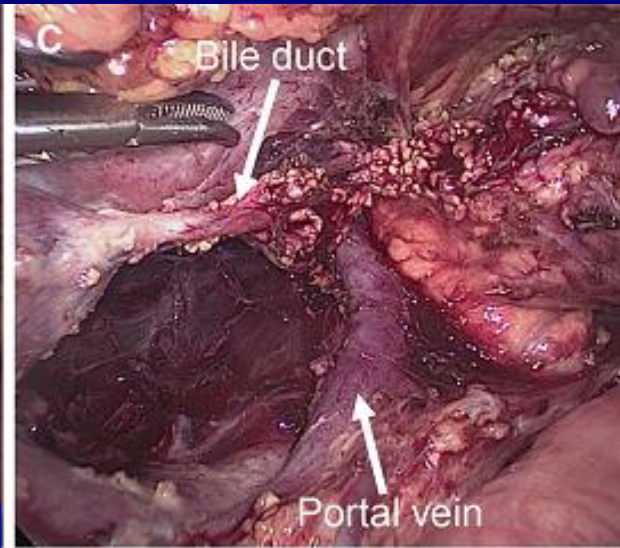MIS nephrectomy in a 4-year-old boy with a Wilms tumor

Single incision surgery in a 12-year-old girl with a mature teratoma of the right ovary

Hybrid operation with MI assisted transabdominal resection of a mature teratoma Altman type IV

A

B Tumor
Whipple procedure

C Bile duct
Portal vein

D

E

F
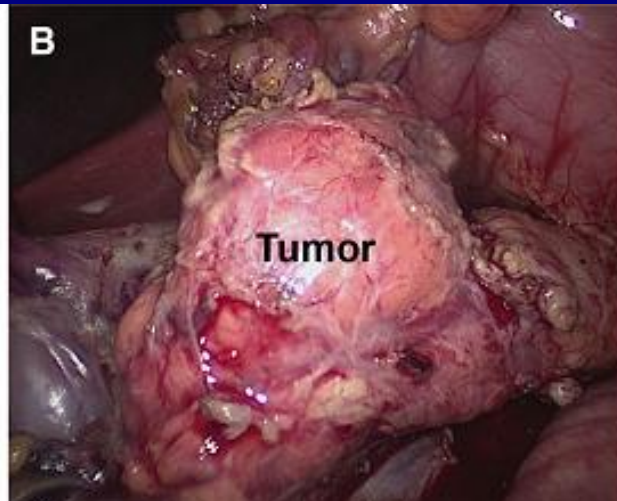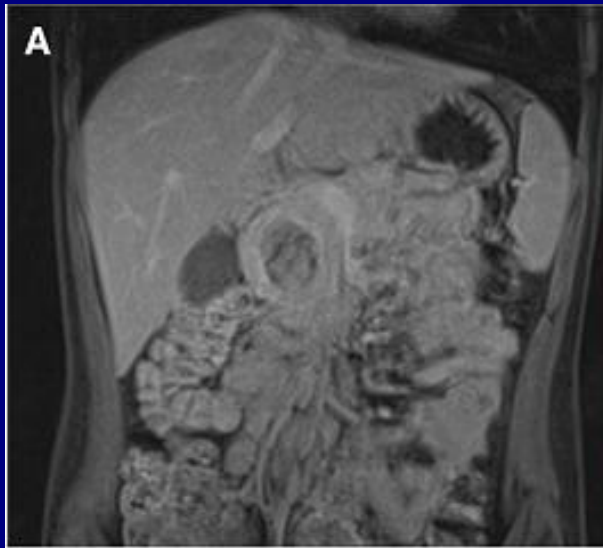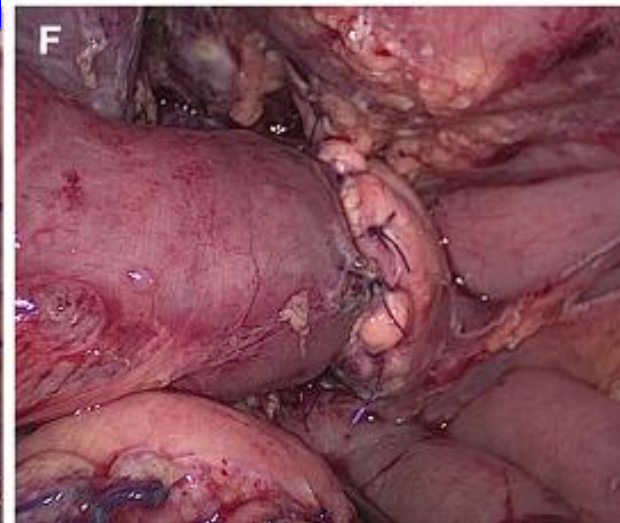
MIS pancreatic head resection in a 10-year-old girl with a pseudopapillary tumor
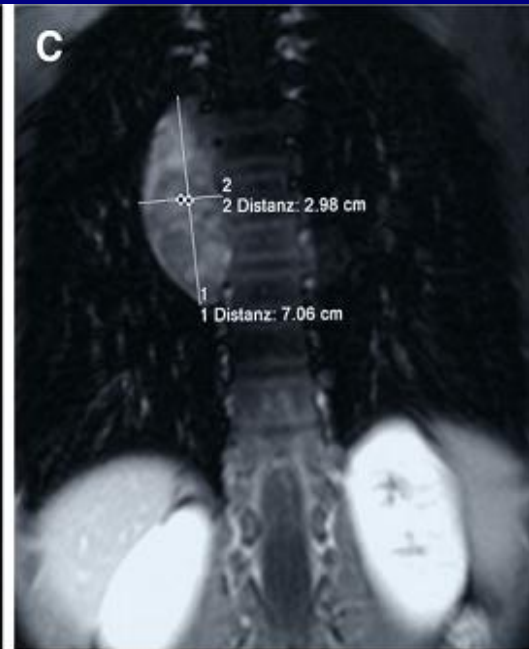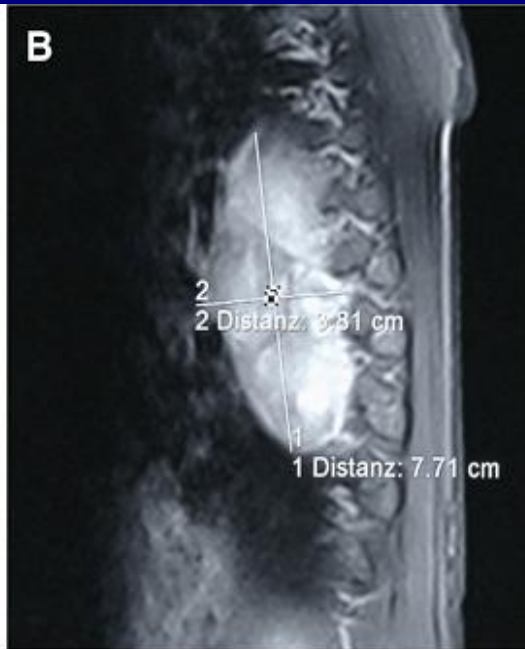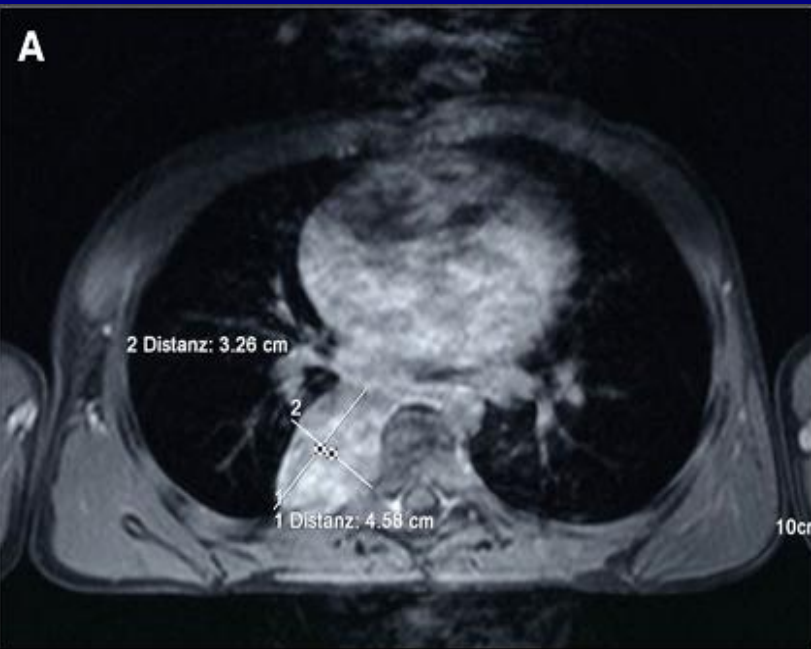
A 10-year-old boy with a thoracic ganglioneuroma

MIS - SOLID TUMORS

★ **EVIDENCE-BASE MEDICINE??**

MEDICAL EVIDENCES?

MEDICAL EVIDENCES?

Minimally invasive surgery versus open surgery for the treatment of solid abdominal and thoracic neoplasms in children (Review)

van Dalen EC, de Lijster MS, Leijssen LGJ, Michiels EMC, Kremer LCM, Caron HN, Aronson DC

THE COCHRANE COLLABORATION

Case series, Retrospective studies, Cohort Studies

542 records identified through database searching

Zero additional records identified through other sources

542 records screened

534 records excluded

8 full-text articles assessed for eligibility

8 full-text articles excluded, with reasons

Zero studies included in qualitative synthesis

No RCTs and CCTS
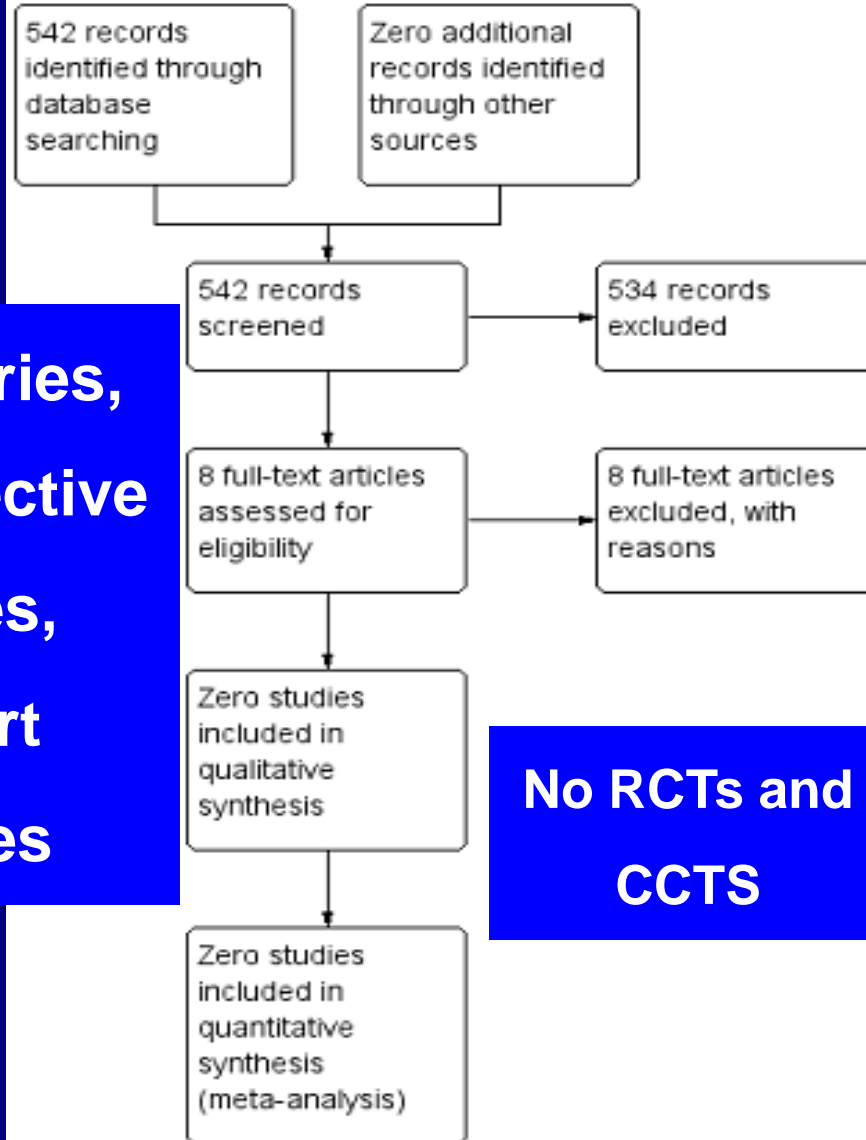
Zero studies included in quantitative synthesis (meta-analysis)

MIS and Oncological surgery

✴ Reports on minimally invasive surgical procedures in solid tumors are increasingly observable

✴ The emphasis of surgery in children with solid tumors lies not on the feasibility but on the strict adherence to oncological principles

Specific challenges in MIS of pediatric solid tumors

* Small working space in large tumors
* Risk of tumor spillage
* Tactile restriction
* Retrieval of large tumors
* Management of tumors with vascular encasement
* Learning curve

The role of surgery in Solid tumor

* Biopsy is required: neuroblastoma, soft tissue sarcoma

* Biopsy is allowed but not mandatory: liver tumors 6 months to 3 years

* Biopsy must not be performed: nephroblastoma

* Surgical radicality is of prognostic significance

* Minimal residual tumor can be accepted without impairment of the survival (Neuroblastoma)

CONCLUSIONS

❖MIS is increasingly being used as surgical approach in children with solid tumors and will have a definitive place in the future in this field

❖MIS for tumors in children should be used with a careful patient selection after thorough decision-making processes

Future Directions

* Limitations of current MIS technology
  * No wrist
  * 2-dimensional images
  * Distance from operative field

* Solution---daVinci operative system
  * Robot arm with 5 degrees of freedom
  * True 3-dimensional images
  * Work station allows "total immersion"

THANK YOU VERY MUCH