Principle of Surgical Oncology

Assoc. Prof. Chairat Supsamutchai

Surgical Oncology

GI and Gen Unit

Surgical Oncologist

"A surgical oncologist is a well-qualified surgeon who has obtained additional training and experience in the multidisciplinary approach to the prevention, diagnosis, treatment, and rehabilitation of cancer patients, and devotes a major portion of his or her professional practice to these activities and cancer research."

Dr. Ranga Perera
MBBS,MS (Colombo) MRCS (Eng)

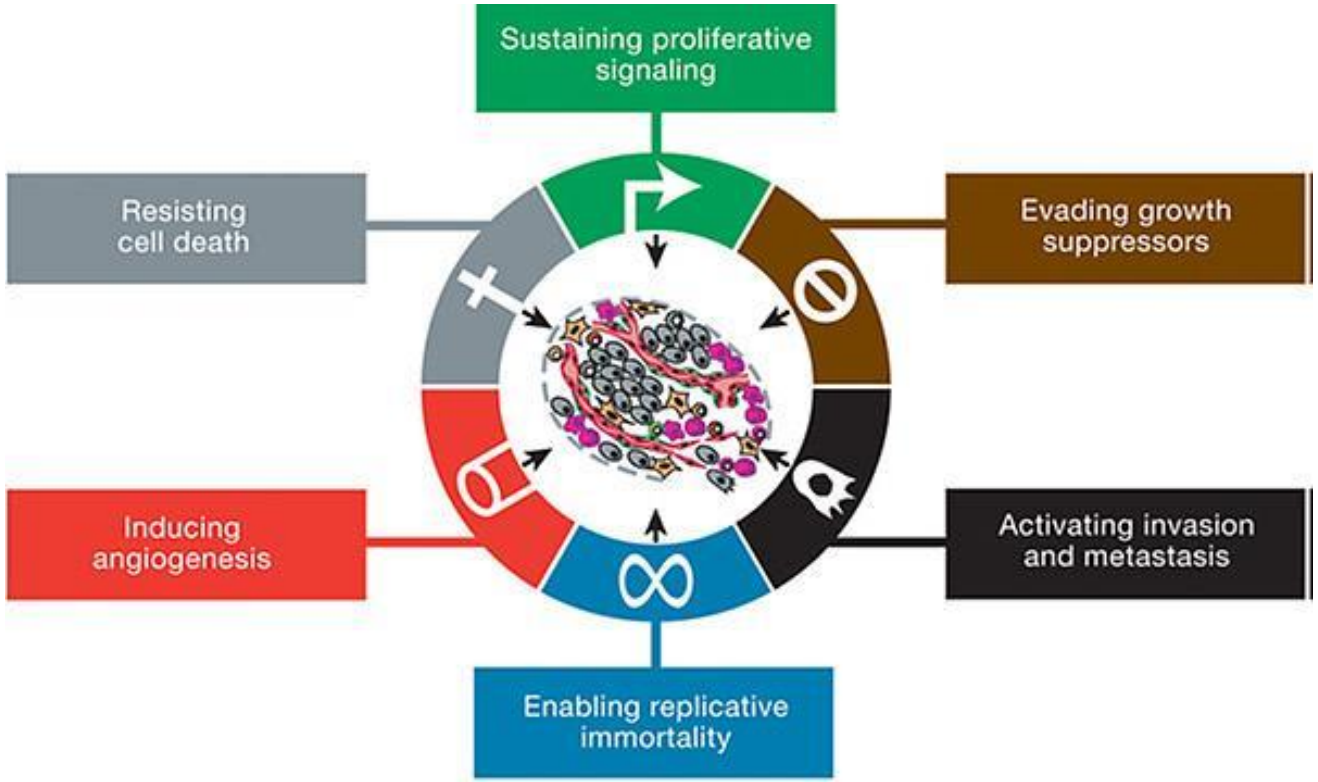
Surgeon's Role in Modern Oncology

"Surgery makes its contribution to cancer treatment in concert with other modalities. Advances in the treatment of cancer will derive from improved orchestration with the other modalities rather than from improved operative technique alone."

Bernard Fisher, 1977

The Hallmarks of Cancer

Self sufficiency to growth signals
Insensitivity to antigrowth signals
Evading apoptosis
Limitless replication
Sustain angiogenesis
Tissue invasion & metastasis



General principles

- *Epithelial tumor (Breast, GI, lung, Renal)*

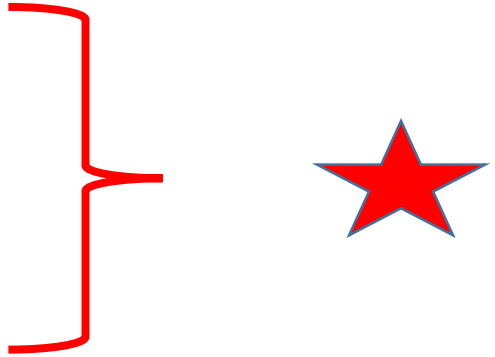
very invasive -invade surrounding (SCC of head and neck) lymphatic and vascular structures

- *Connective tissue tumor (sarcomas)*

displace other structures –hematogenous spread common

Surgical Oncology
Role in Modern Oncology

- Prevention
- Screening
- Diagnosis
- Treatment
- Rehabilitation
- Follow-up care
- Palliative care
- Terminal Care

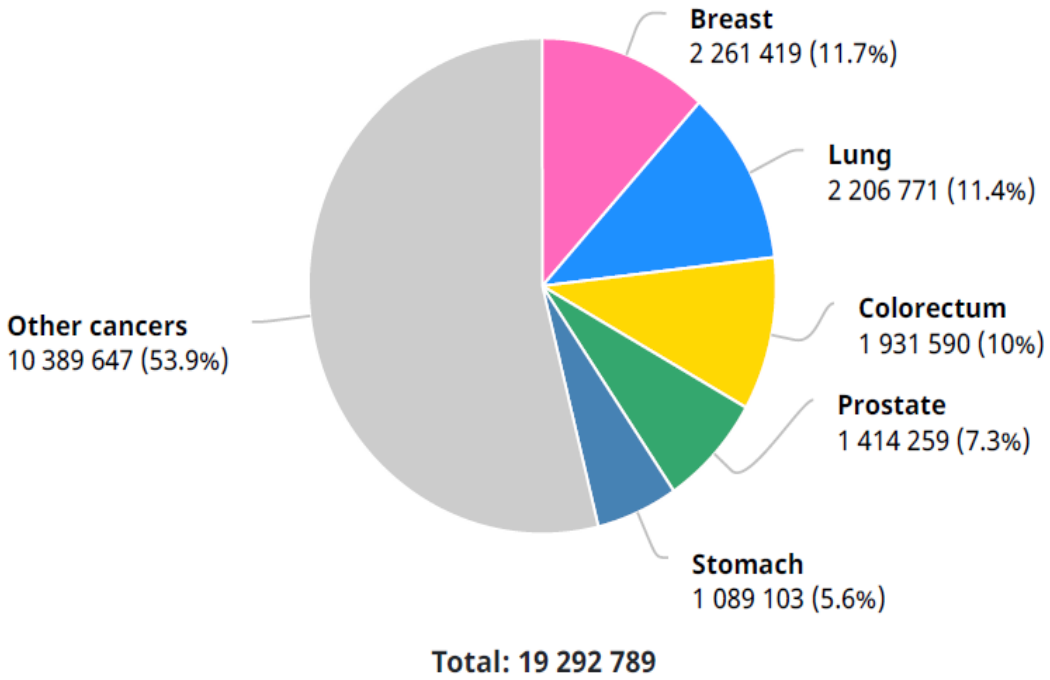


Screening

World

Source: Globocan 2020

Number of new cases in 2020, both sexes, all ages



Total population

7 794 798 844

Number of new cases

19 292 789

Number of deaths

9 958 133

Number of prevalent cases (5-year)

50 550 287

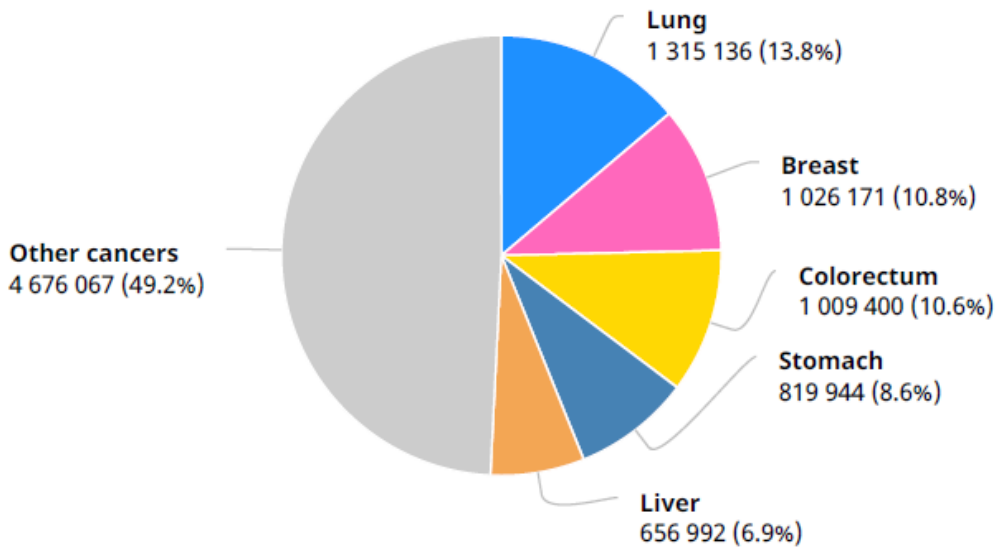
International Agency for Research on Cancer

World Health Organization

Asia

Source: Globocan 2020

Number of new cases in 2020, both sexes, all ages



Total: 9 503 710

Geography

Prevention

FEATURES OF HEREDITARY CANCER SYNDROMES

- Early age of onset of disease

- Multiple family members with the same cancer on one side of the family tree

- Clustering of cancers known to becaused by a gene mutation

- Multiple primary cancers in one individual

Possible Indications of Prophylactic Surgery

Prophylactic Surgery	*Potential Indications*
Bilateral mastectomy	BRCA1 or BRCA2 mutation Familial breast cancer Atypical hyperplasia or lobular carcinoma in situ Unilateral breast cancer in a young patient(<40 years)
Bilateral oophorectomy	BRCA1 or BRCA2 mutation Familial ovarian cancer Hereditary nonpolyposis colorectal cancer At the time of hysterectomy for endometrial cancer At the time of colon resection for colon cancer

Possible Indications of Prophylactic Surgery

Prophylactic Surgery	*Potential Indications*
Thyroidectomy	RET oncogene mutation Multiple endocrine neoplasia (MEN) type 2A MEN type 2B Familial non-MEN medullary thyroid carcinoma
Total proctocolectomy	Familial adenomatous -polyposis or APC mutation HNPCC germline mutation (hereditarynonpolyposis colorectal cancer) Ulcerative colitis
Total Gastrectomy	CDH1 gene

Diagnosis

Biopsy How To biopsy or How not to biopsy?

- Know your tumor biology
  - Biopsy Tract Seeding (Testicular, Salivary)
  - Available Options for therapy

- Change treatment plan?

- Biopsy options (Aspiration, Core, Incisional, Excisional)
  - Avoid hematoma
  - Plan to excise needle or biopsy site at Surgery

Tissue biopsy

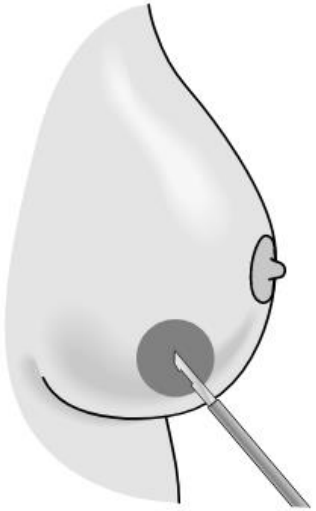
Punch biopsy

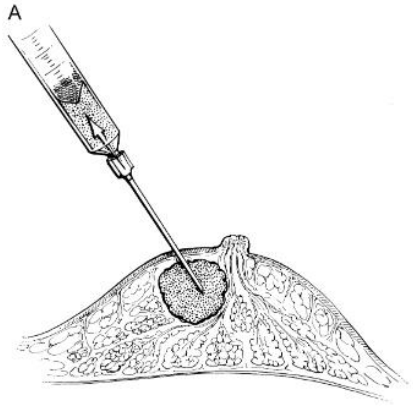
Incisional biopsy

Excisional biopsy

Fine-Needle Aspiration

Core-needle biopsy





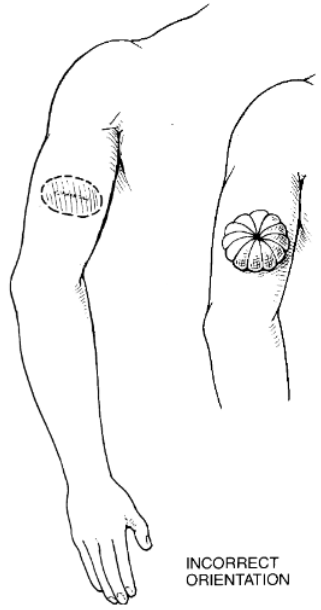
PRINCIPLES OF SURGICAL BIOPSIES

Obtain sufficient tissue for diagnosis.

Consider a frozen section to assess adequacy.

Handle tissue properly.

Orient tissue for accurate margins.



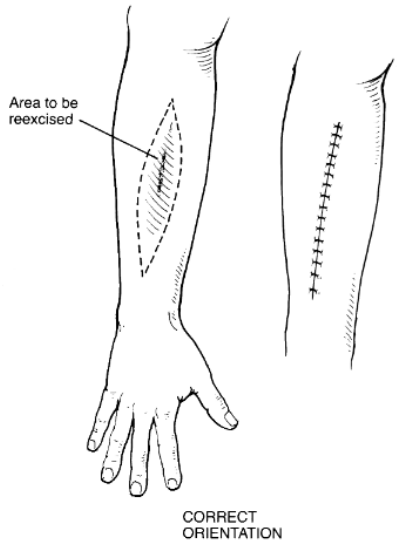
PRINCIPLES OF SURGICAL BIOPSIES

Send tissue in proper medium for special studies.

The biopsy should not interfere with subsequent therapy.

Prevent hematomas

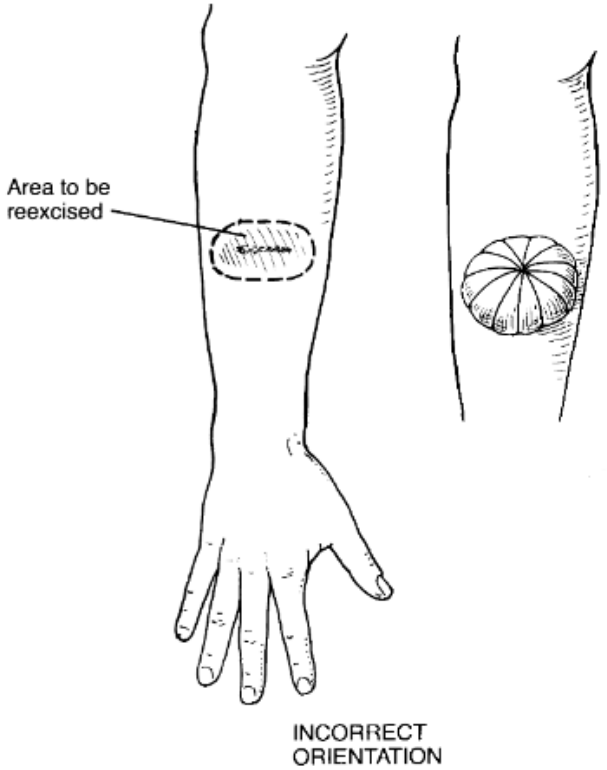
Orient incisions with the next operation in mind.

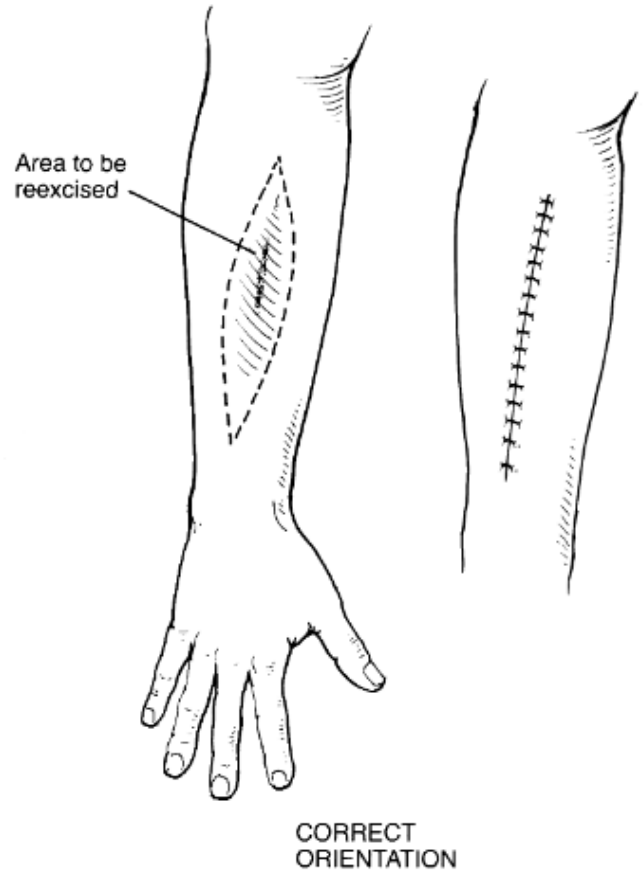


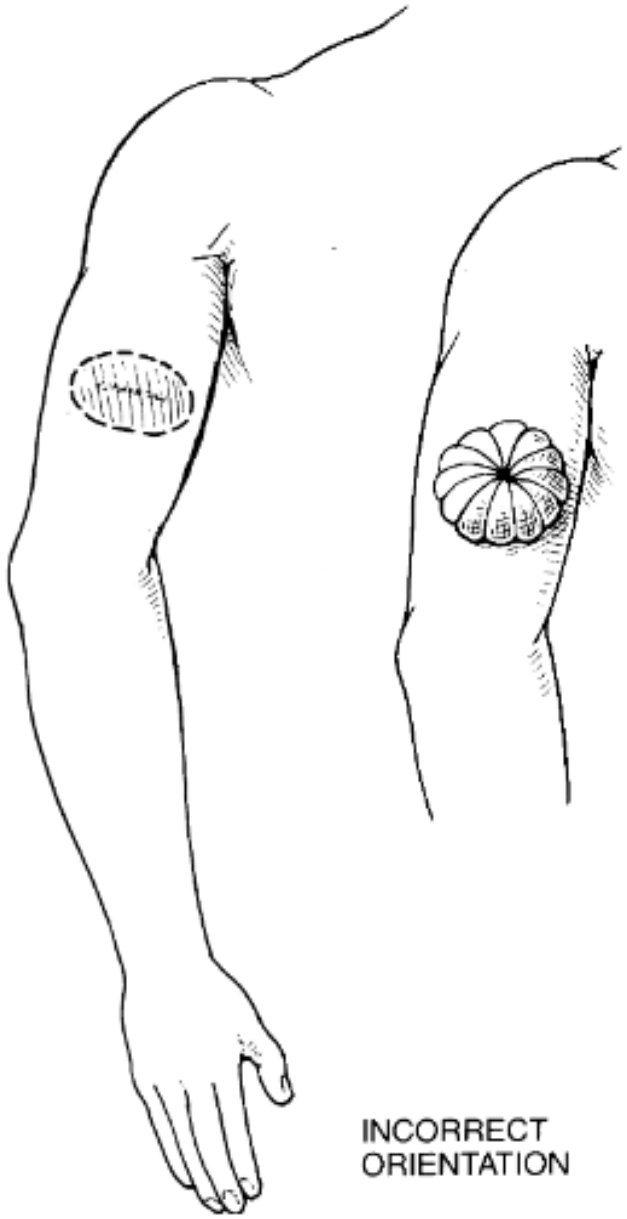
Subcutaneous lipoma

large lipomas (>5 cm)
Irregular in shape
Myofascial involvement

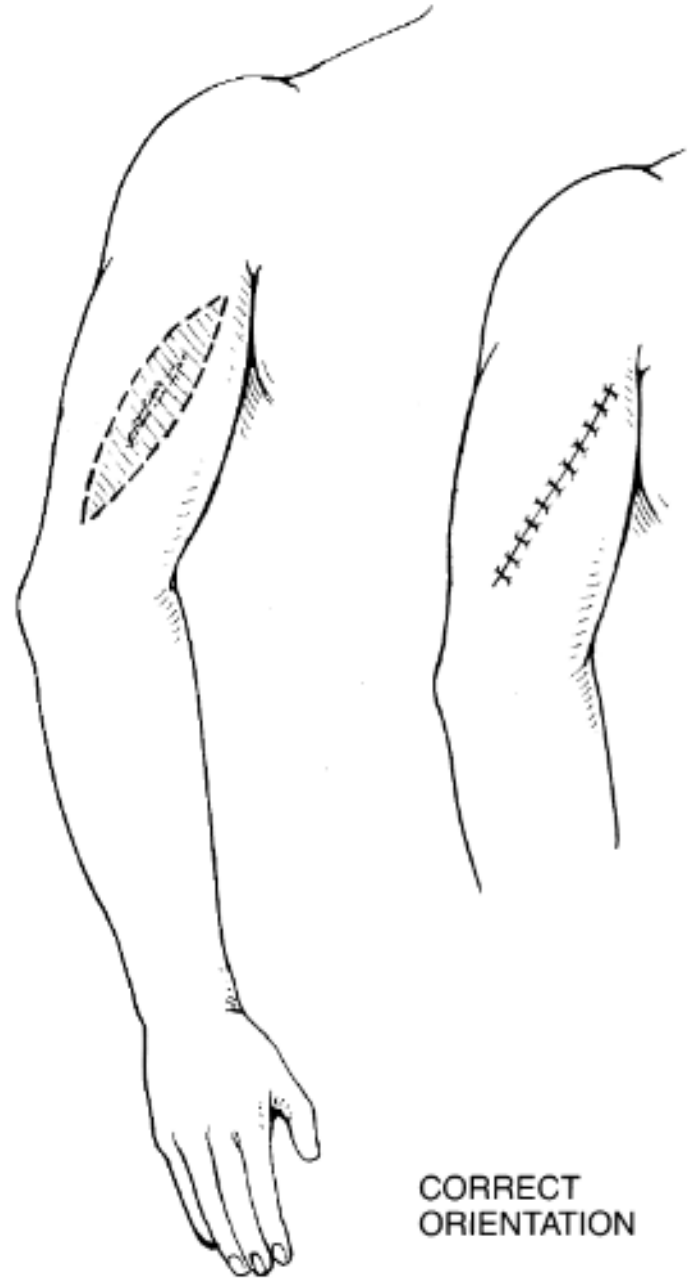
Imaging







INCORRECT
ORIENTATION



CORRECT
ORIENTATION

Fine-Needle Aspiration

Diagnosis of an enlarged lymph node

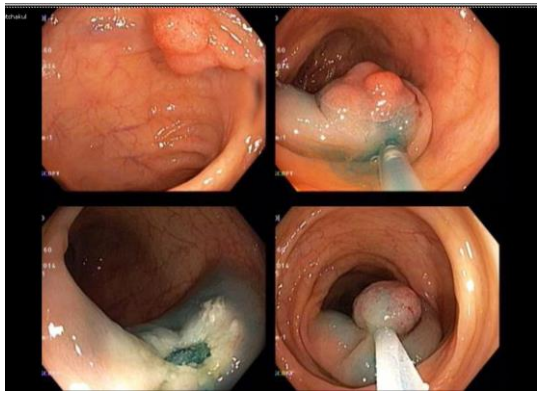
Diagnosis of a thyroid nodule

Diagnosis (and aspiration) of a suspected breast cyst

Confirmation of recurrent or metastatic disease

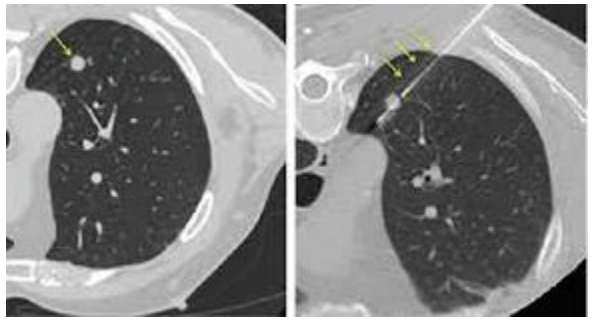
Proof of malignancy

Endoscopic Biopsy

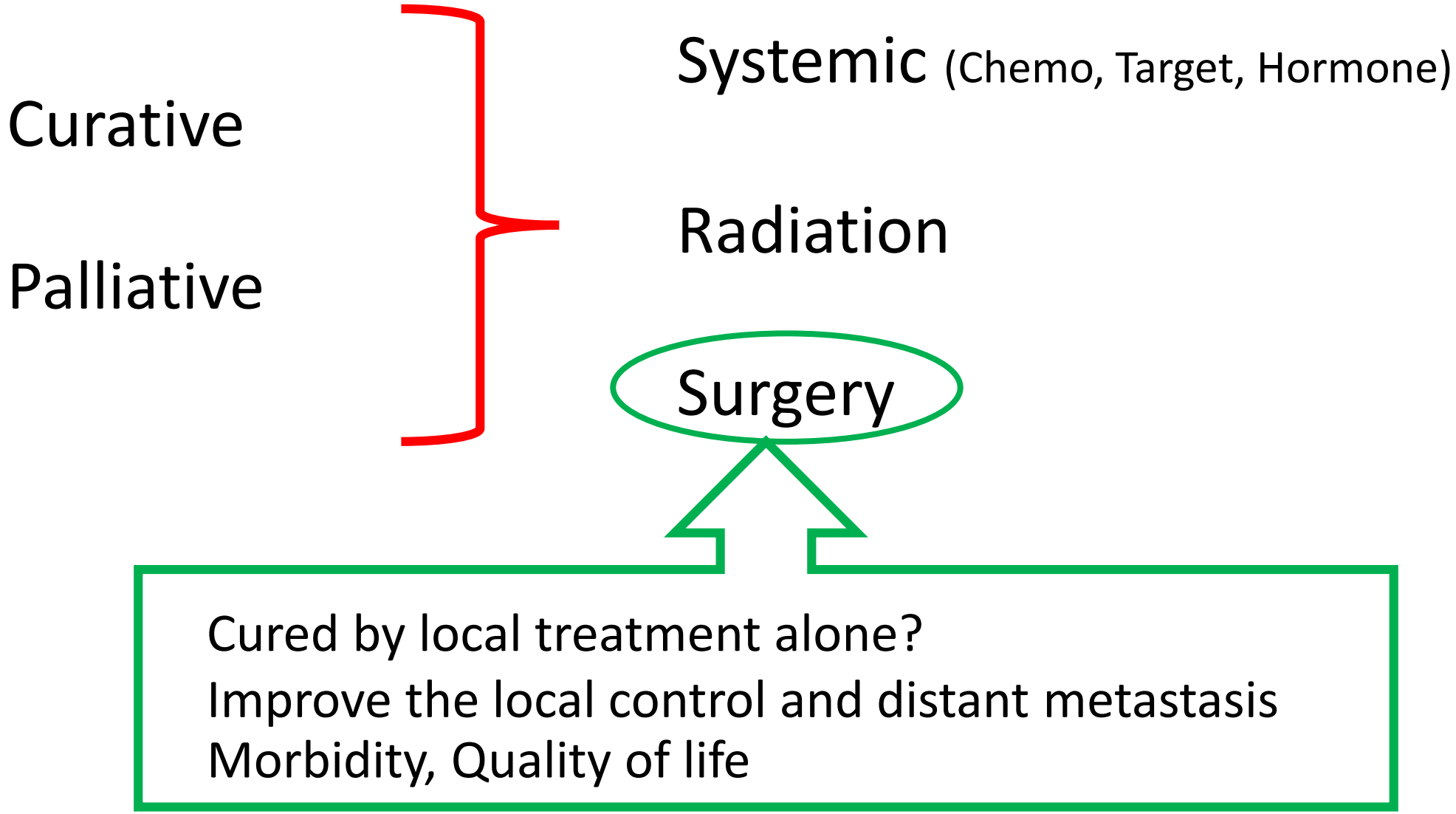


Endoscopic ultrasound with FNA

Imaging Guide Biopsy



Treatment


Curative
Palliative
Systemic (Chemo, Target, Hormone)
Radiation
Surgery
Cured by local treatment alone?
Improve the local control and distant metastasis
Morbidity, Quality of life

FACTORS TO CONSIDER WHEN PLANNING SURGERY FOR CANCER PATIENTS

Overall health of the patient and expected survival

- Age
- Performance status
- Comorbidities

Tumor type and stage

- Long-term survival and potential benefits of surgery
- Disturbances in anatomy and physiology caused by cancer
- Elevated surgical risks as a result of cancer

Technical complexity of the procedure

- Potential surgical complications
- Type of anesthesia needed
- Quality-of-life issues
- Experience of personnel

Eastern Cooperative Oncology Group (ECOG)
Performance Status Criteria Grade ECOG Status

- ✓ 0 Fully active, able to carry on all pre-disease performance without restriction.
- ✓ 1 Restricted in physically strenuous activity but ambulatory and able to carry out work of a light or sedentary nature (e.g., light housework, office work.)
- ✓ 2 Ambulatory and capable of all self-care but unable to carry out any work activities; up and about more than 50% of waking hours
- ✓ 3 Capable of only limited self-care; confined to bed or chair more than 50% of waking hours
- ✓ 4 Completely disabled; cannot carry on any self-care; totally confined to bed or chair
- ✓ 5Dead

Karnofsky Performance Status

100 Normal, no complaints; no evidence of disease
90 Able to carry on normal activity; minor signs or symptoms of disease
80 Normal activity with effort; some signs or symptoms of disease
70 Cares for self but unable to carry on normal activity or to do active work
60 Requires occasional assistance but is able to care for most personal needs
50 Requires considerable assistance and frequent medical care
40 Disabled; requires special care and assistance
30 Severely disabled; hospitalization is indicted, although death is not imminent
20 Very ill; hospitalization and active supportive care are necessary
10 Moribund
0 Dead

ROLE OF SURGERY IN THE MANAGEMENT OF CANCER

Diagnosis of suspicious masses

- Staging established cancers
- Curative resection of primary cancers
- Prevention of cancer by prophylactic surgery
- Debulking cancer as part of multi-modality therapy
- Palliation of incurable patients

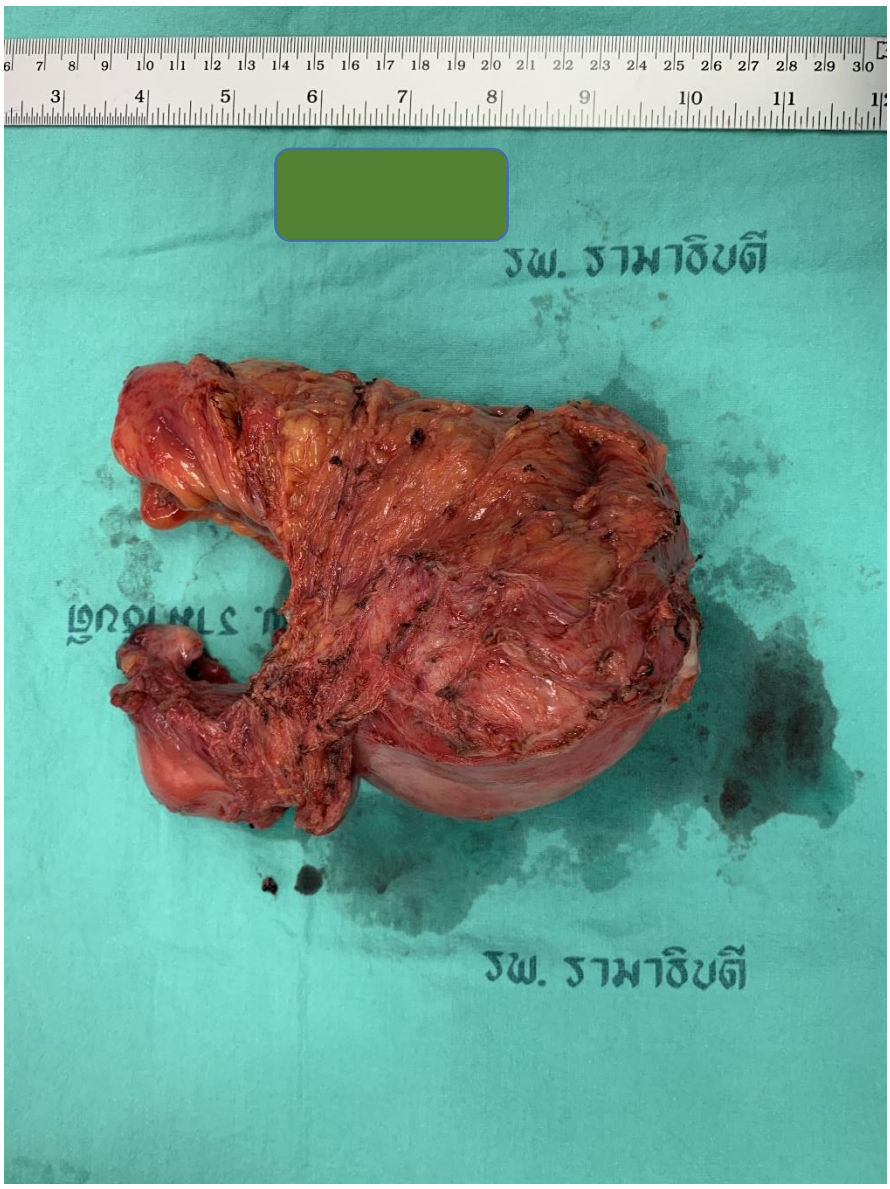
The tumor status residual tumor (R) classification:

- R0 = no residual tumor (Tumor and Lymph node)

R1 = microscopic residual tumor

R2 = macroscopic residual tumor.

En bloc resection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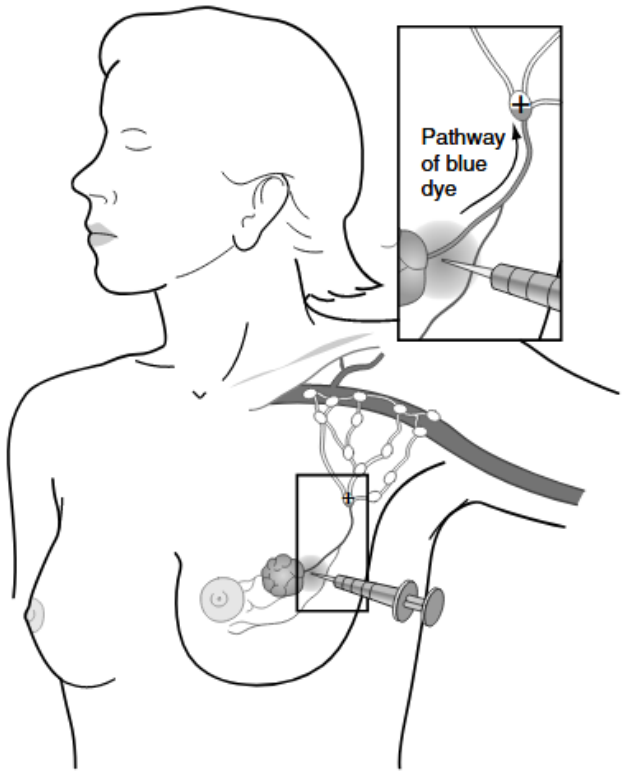
Sentinel lymph node biopsy



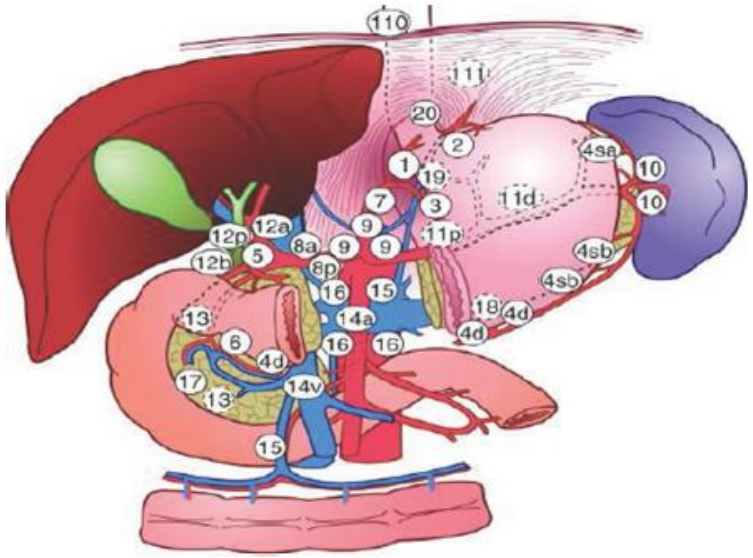
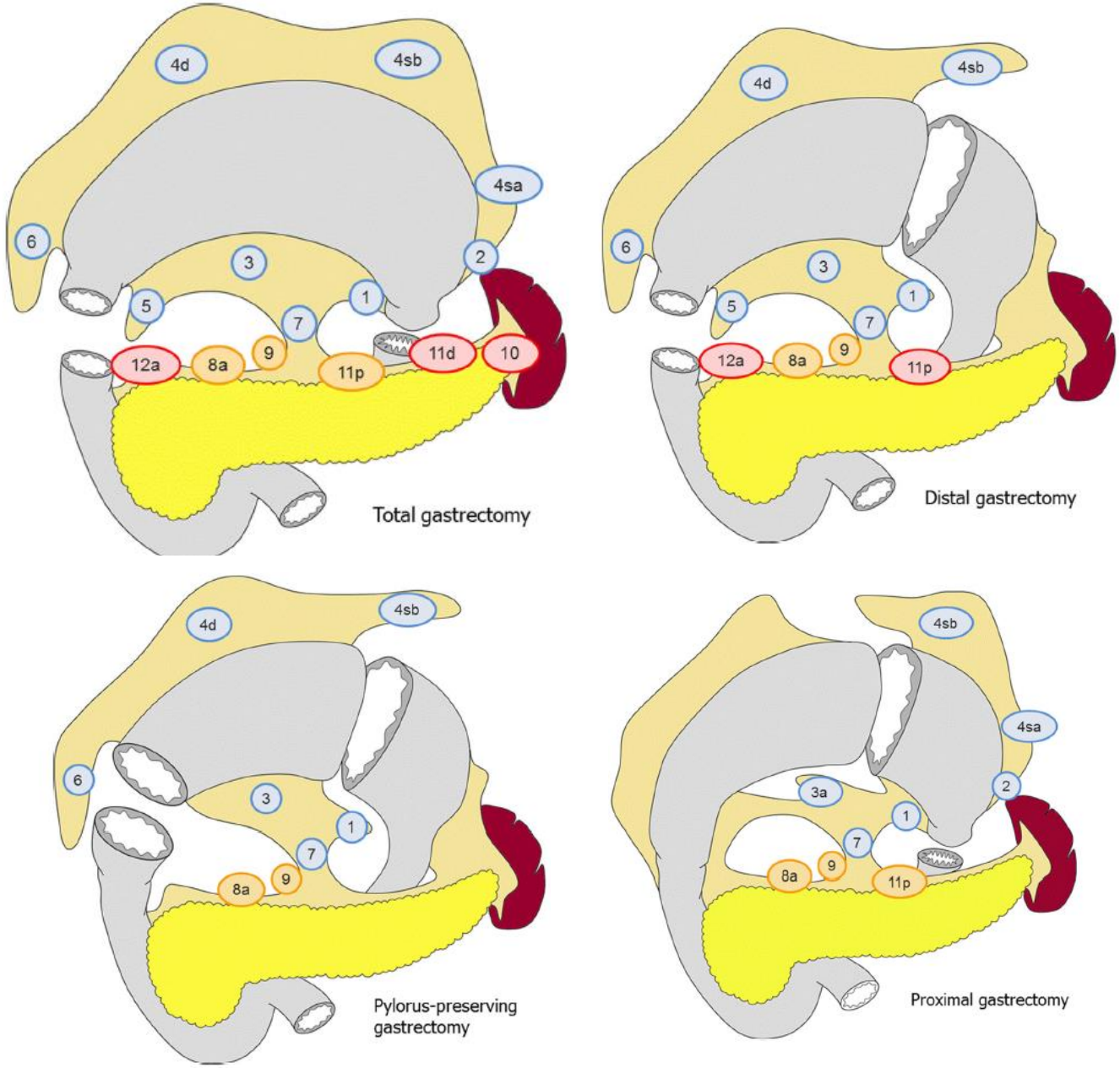


Fig. 1 Lymph-node stations according to the Japanese gastric cancer guidelines

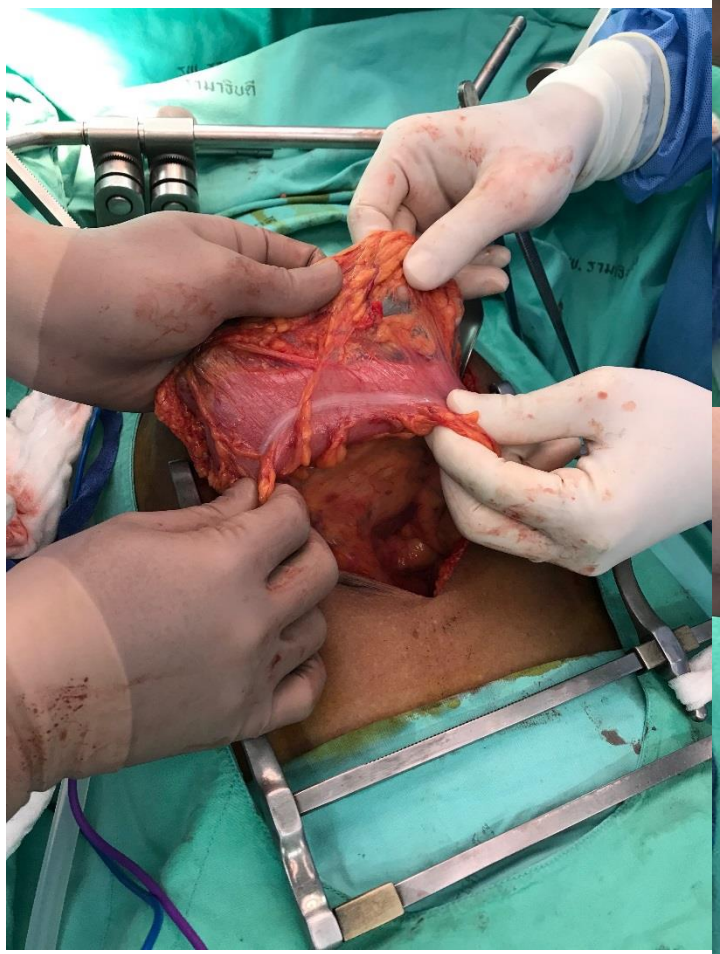
Table 1 Lymph-node stations to be removed for D1 and D2 lymphadenectomy in total and distal gastrectomy

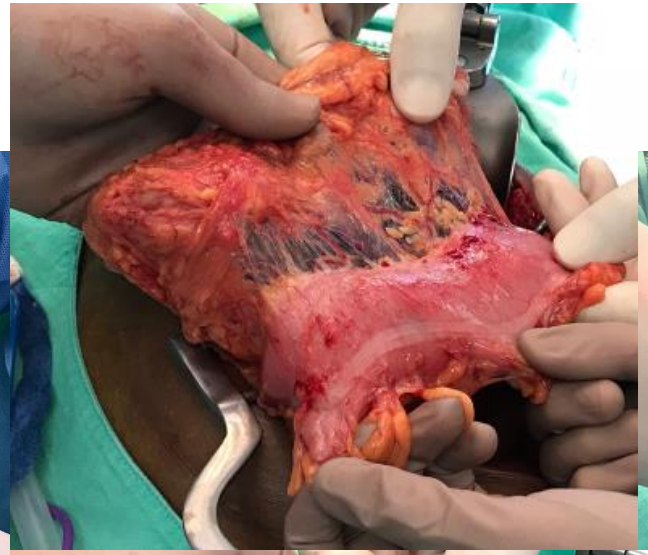
Resection	Lymph-node stations to be removed
Total gastrectomy	
D1	1–7
D1+	D1+ 8a, 9, 11p
D2	D1+ 8a, 9, 10, 11p, 11d, 12a
Distal gastrectomy	
D1	1, 3, 4sb, 4d, 5, 6, 7
D1+	D1+ 8a, 9
D2	D1+ 8a, 9, 11p, 12a

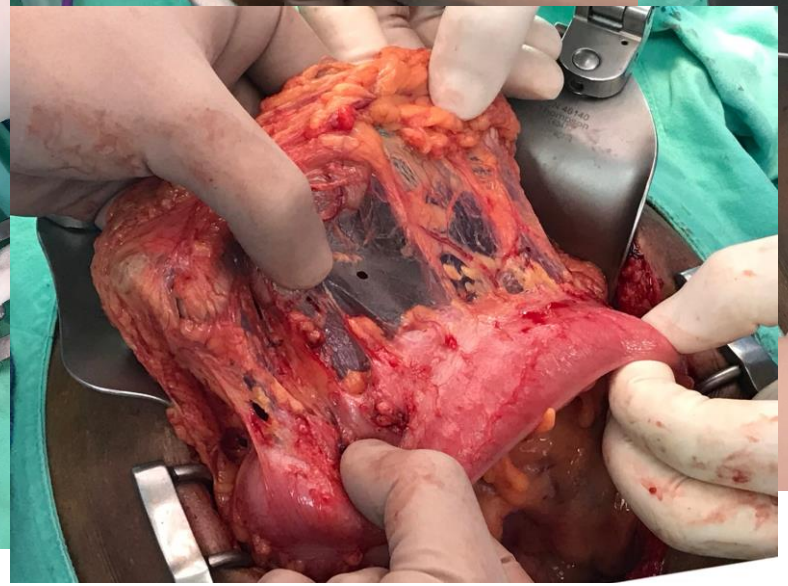
Wietse J. Eshuis. Updates in Surgery (2018) 70:197–205

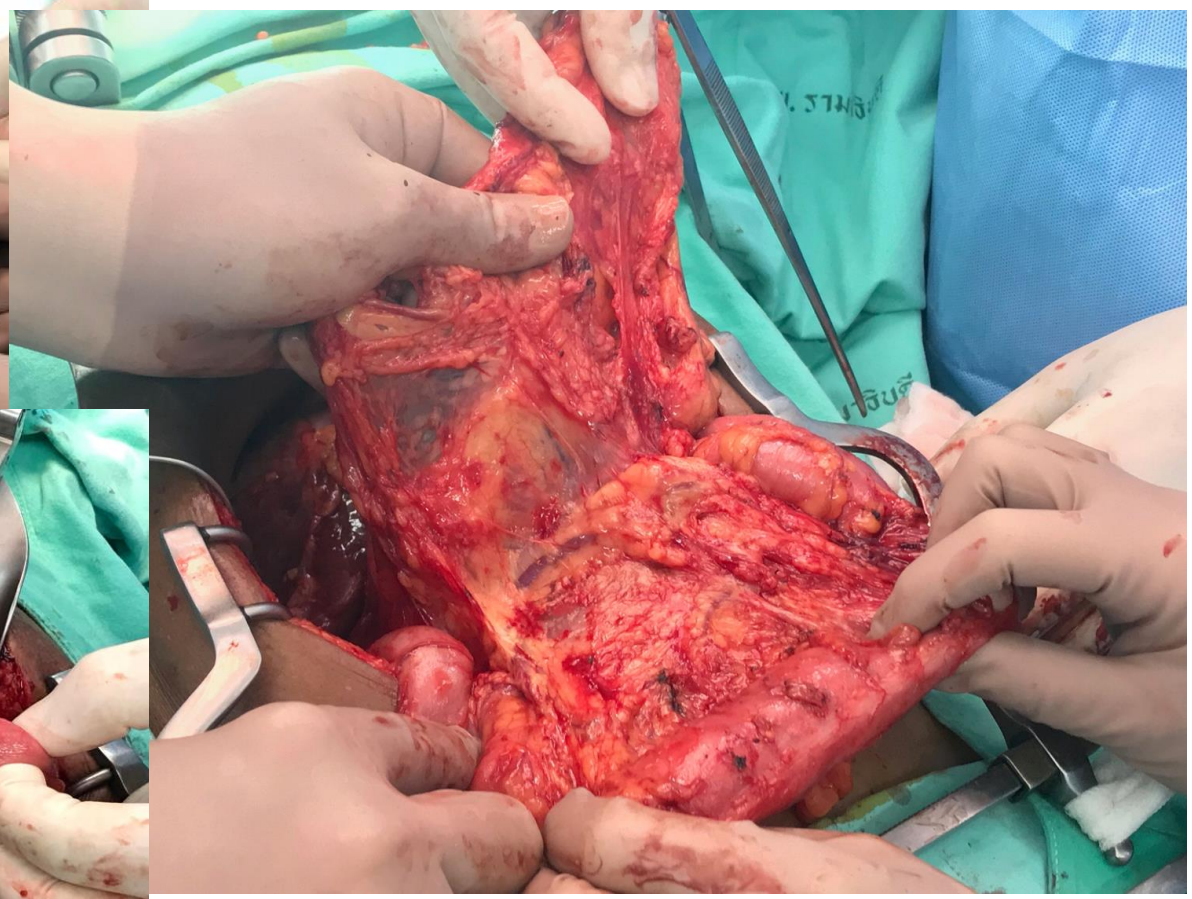


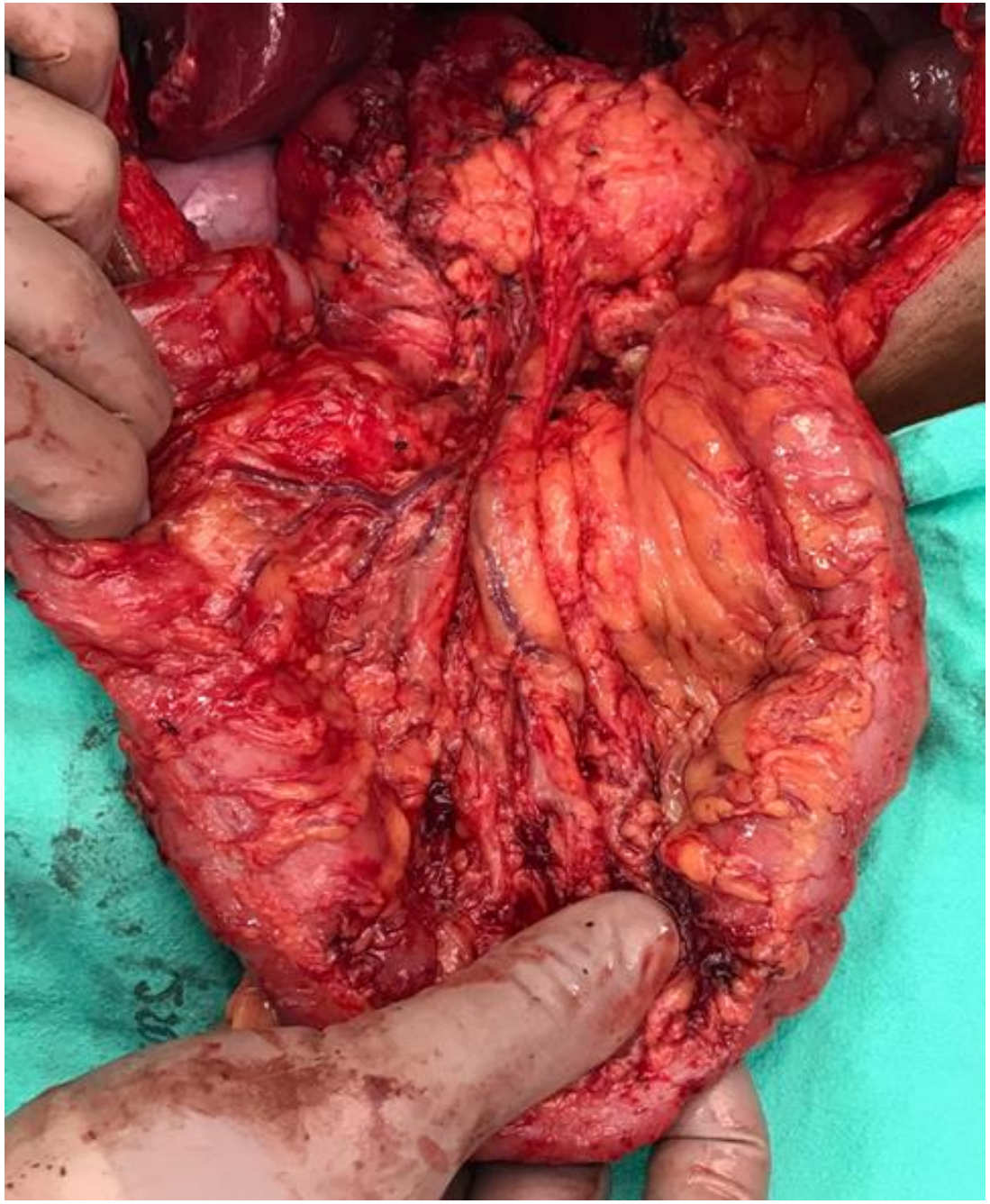
Gastric Cancer (2017) 20:1–19

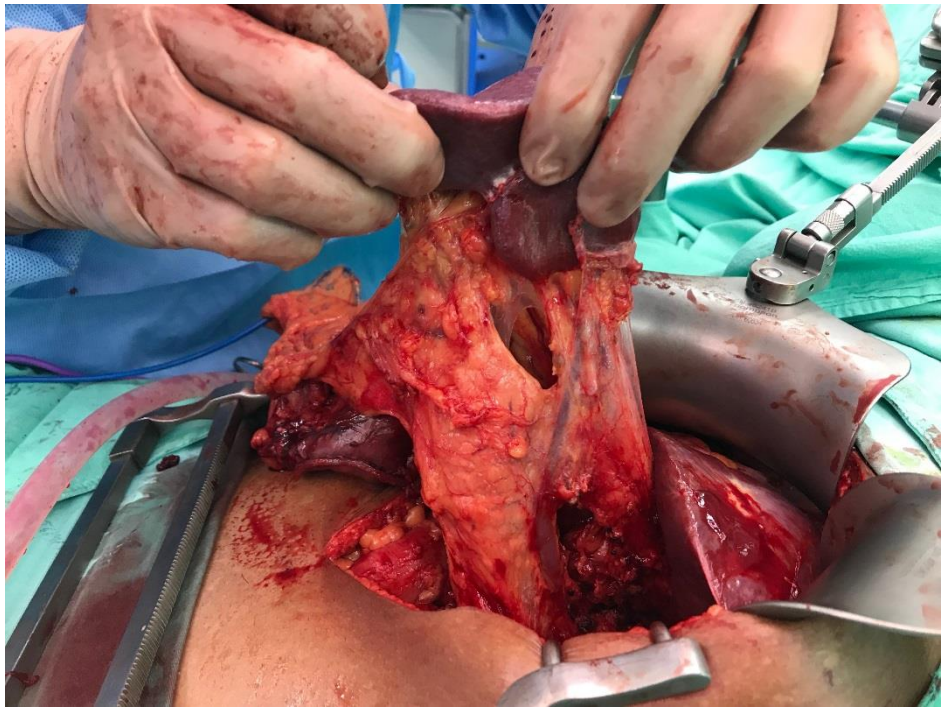


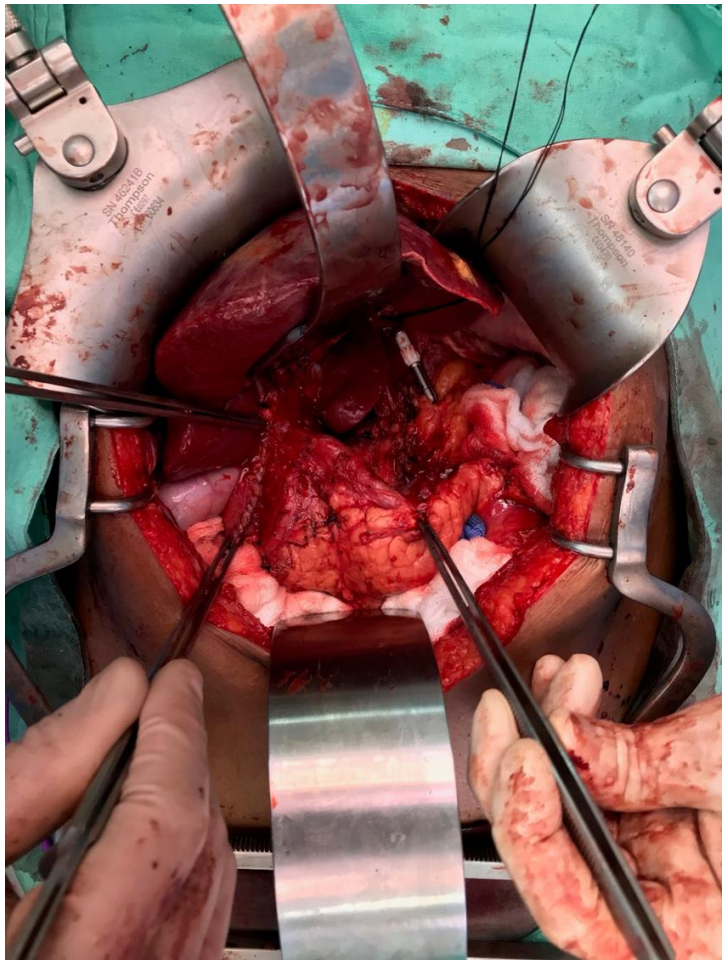


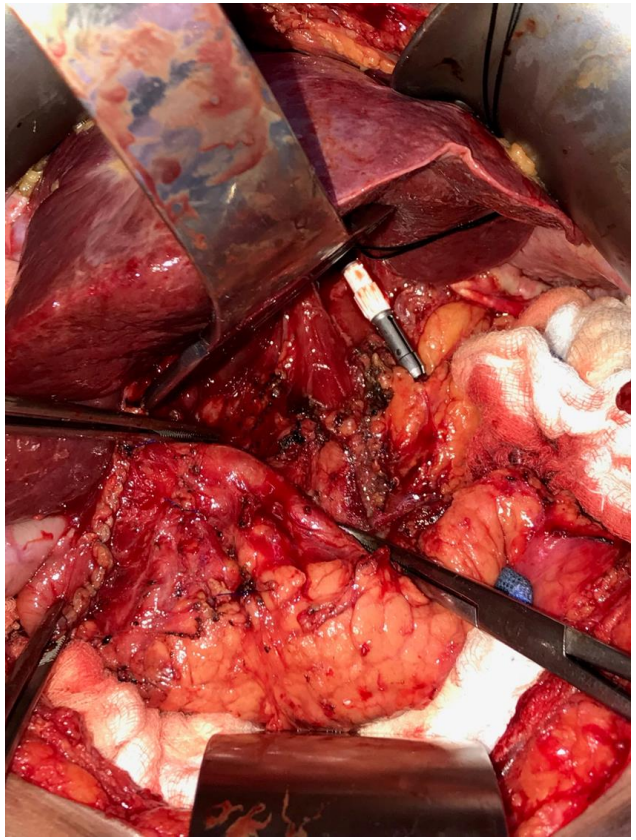


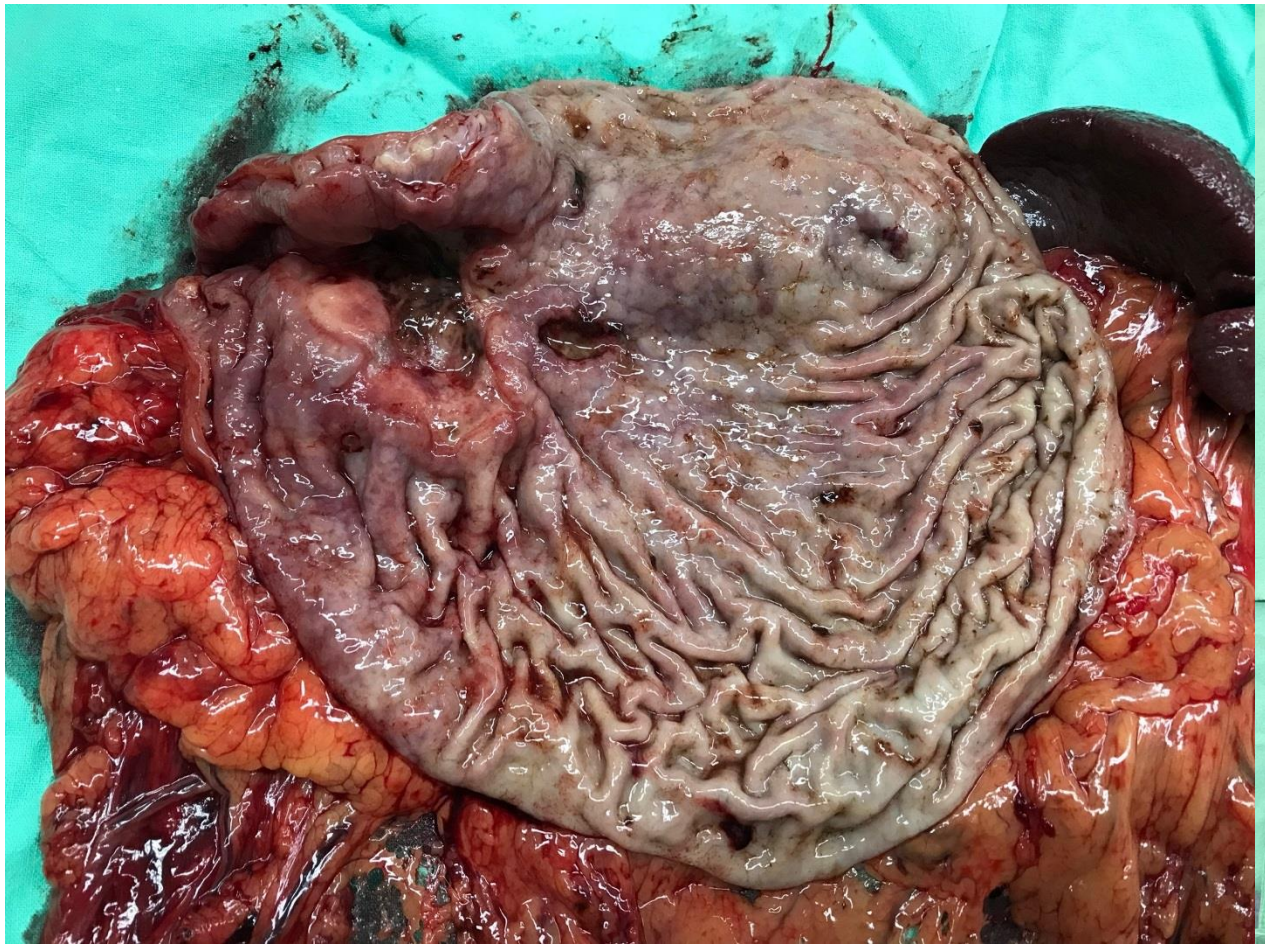


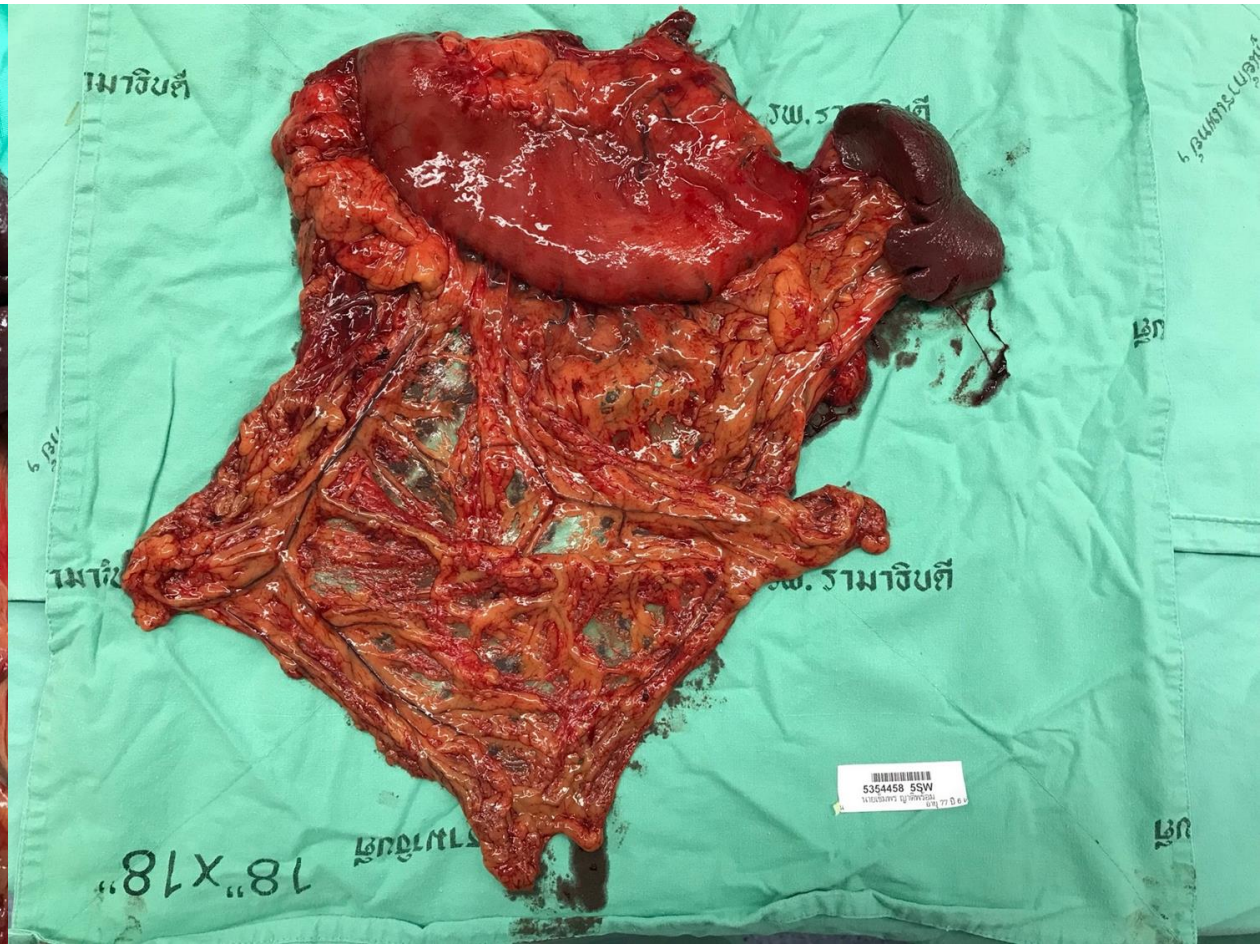








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Cyto reductive Surgery

Extensive local spread of cancer precludes the removal of all gross disease by surgery

Partial surgical resection of bulk disease in selected cancers improves the ability of other treatment modalities to control unresectable residual gross disease.

Cytoreductive surgery is of benefit only when other effective treatments are available to control unresectable residual disease

Surgeon's Role in Modern Oncology

"Surgery makes its contribution to cancer treatment in concert with other modalities. Advances in the treatment of cancer will derive from improved orchestration with the other modalities rather than from improved operative technique alone."

Bernard Fisher, 1977

MIS in abdominal surgery

(Mimimally Invasive Surgery)

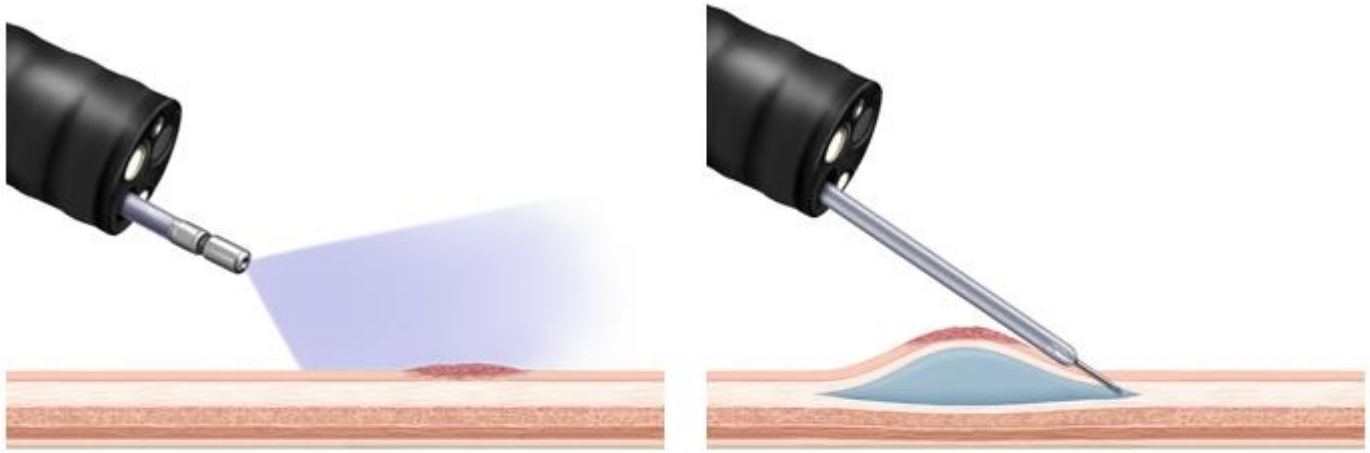
- Natural orifice transluminal endoscopic surgery (NOTES) , Endoscopic

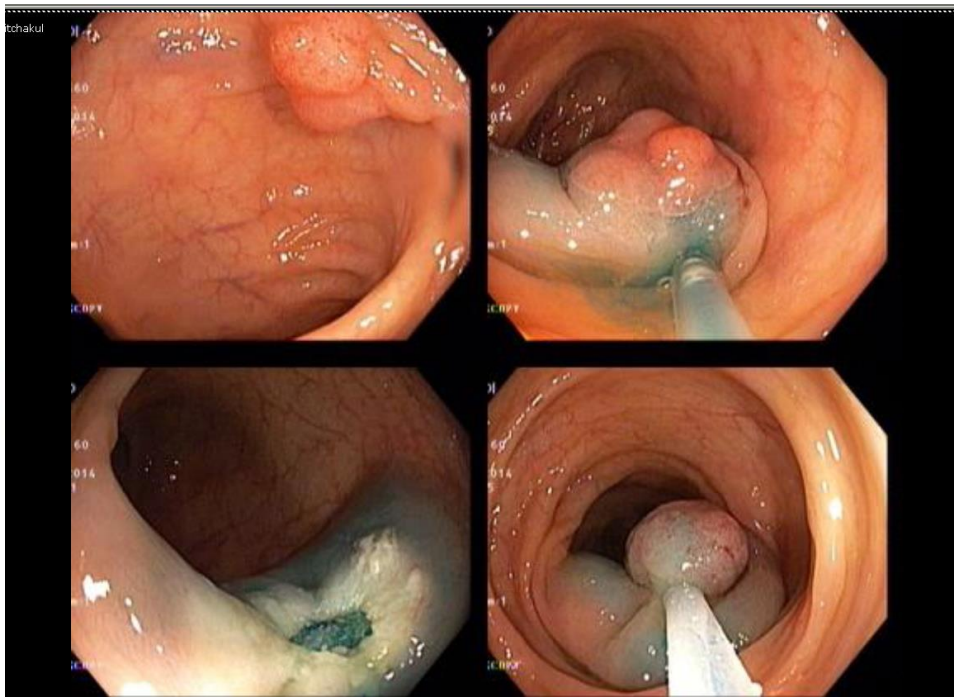
- Laparoscopic → single-incision laparoscopic surgery (SILS)

- Robotic surgery

Natural orifice transluminal endoscopic surgery (NOTES) , Endoscopic

EMR
(Endoscopic mucosal resection)

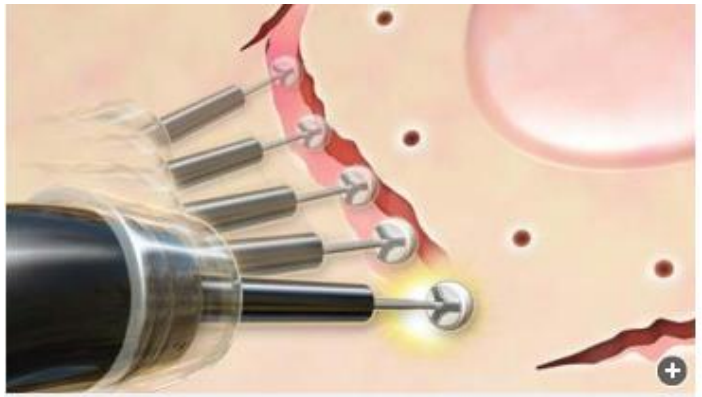




EMR in lower GI tract

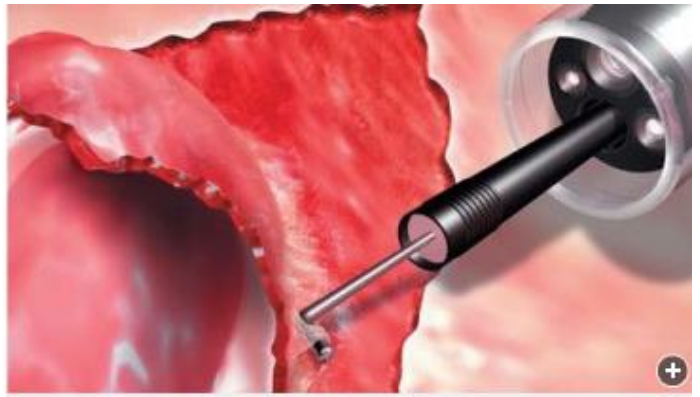
Endoscopic Submucosal Dissection (ESD)

Endoscopic Submucosal Dissection (ESD)



ITKnife2

Unique electrode design on the proximal side of the tip minimises invasiveness whilst maximising cutting versatility. It is a safe and fast knife, especially in gastric ESD.



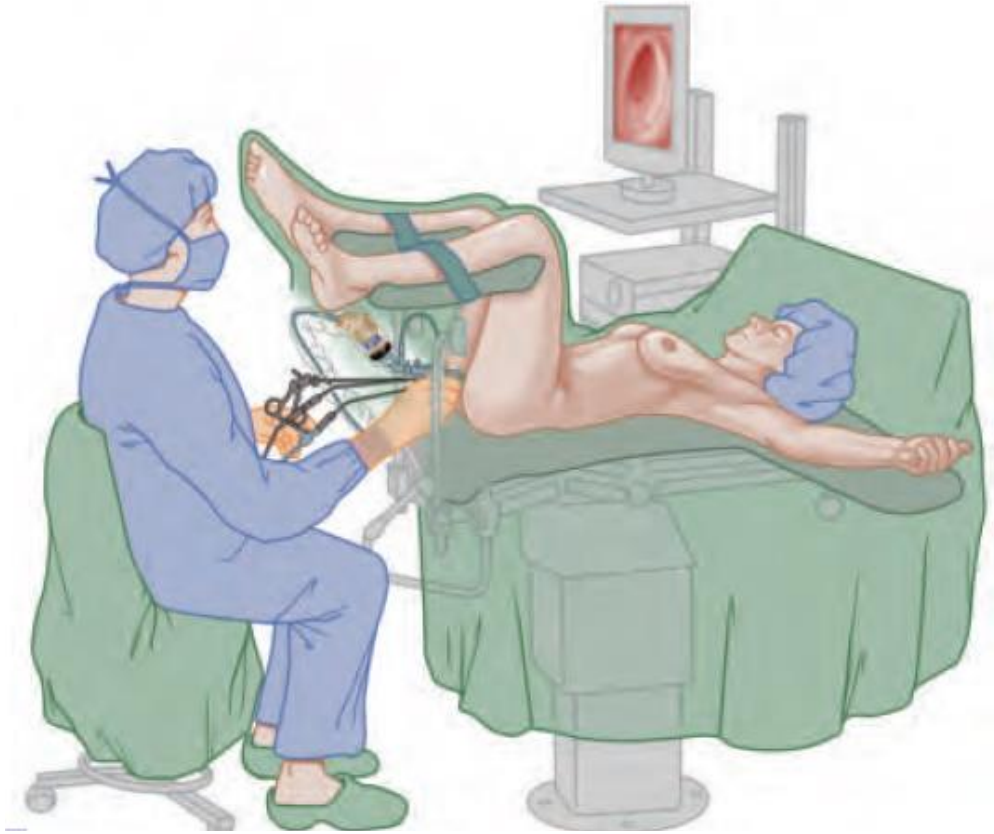
HookKnife

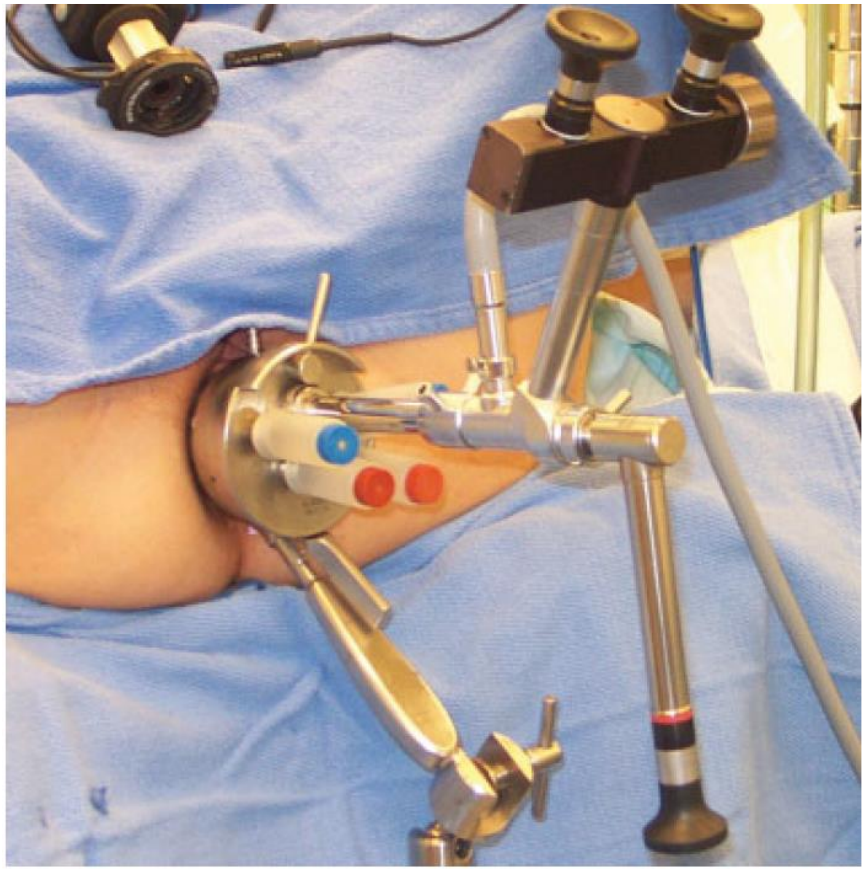
Safest knife in challenging situations such as fibrosis or colorectal ESD due to rotatable hook

DualKnife

Smooth and efficient cutting in all ESD applications.

TEO(Transanal Endoscopic Operation)
TEM (Transanal Endoscopic Microsurgery)






TEO


STORZ


STORZ


MAQUET

TAMIS

Contents lists available at ScienceDirect

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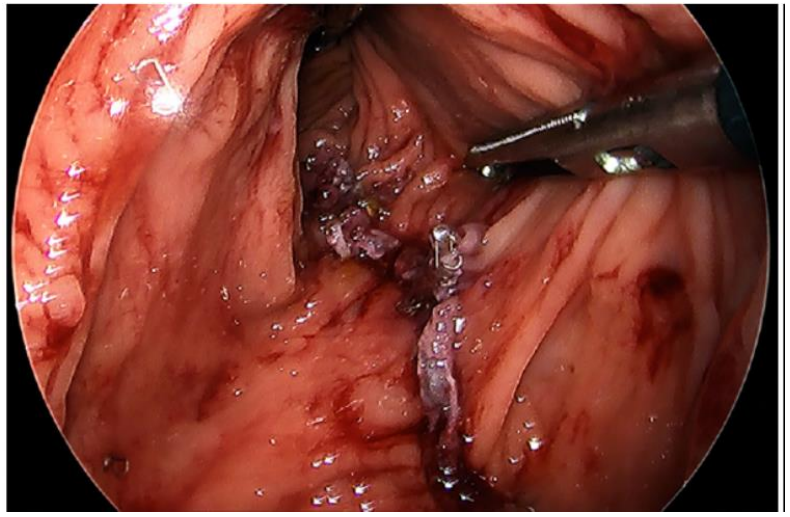
journal homepage: www.casereports.com

Case Series

Trans-anal minimally invasive surgery: A new technique to avoid peritoneal entry

Anne-Marie Dufresne[a,b,*], Rebecca Withers[a,b], Jonathan Ramkumar[a,b], Shawn Mackenzie[a,b], George Melich[a,b], Elena Vikis[a,b]

[a] Royal Columbian Hospital, Department of Surgery, 330 E Columbia St., New Westminster, BC, V3L 3W7, Canada
[b] University of British Columbia, Faculty of Medicine, Department of Surgery, 2775 Laurel Street, 11th Floor, Vancouver, BC, V5Z 1M9, Canada



Laparoscopy

Cancer Surgery

Possibility of port-site metastasis

Lower number of lymph nodes retrieved

The whole specimen extraction

Non-inferior cancer-free survival

Lapo Bencini
World J Gastroenterol 2014 February 21; 20(7): 1777-1789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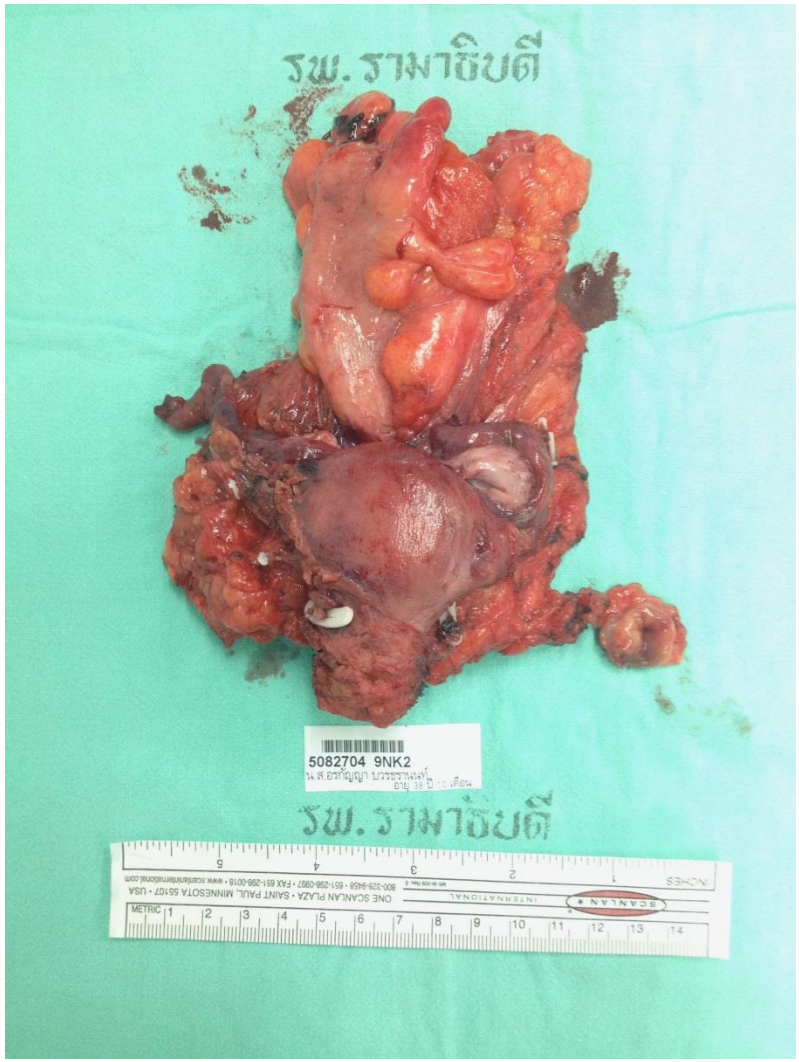
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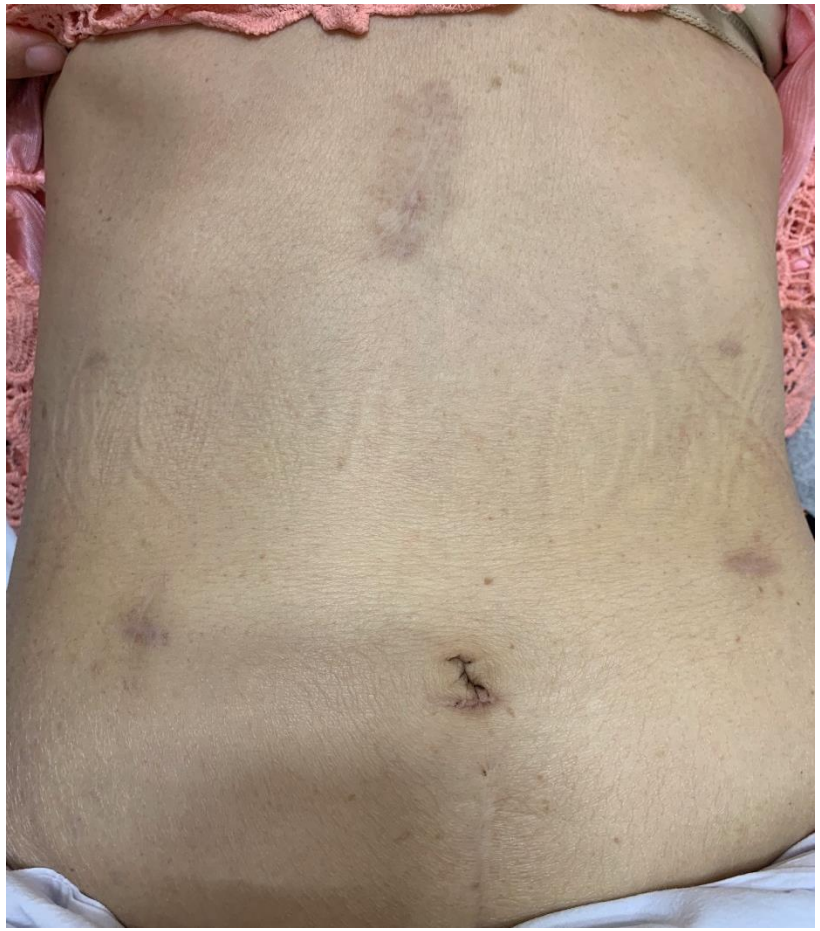
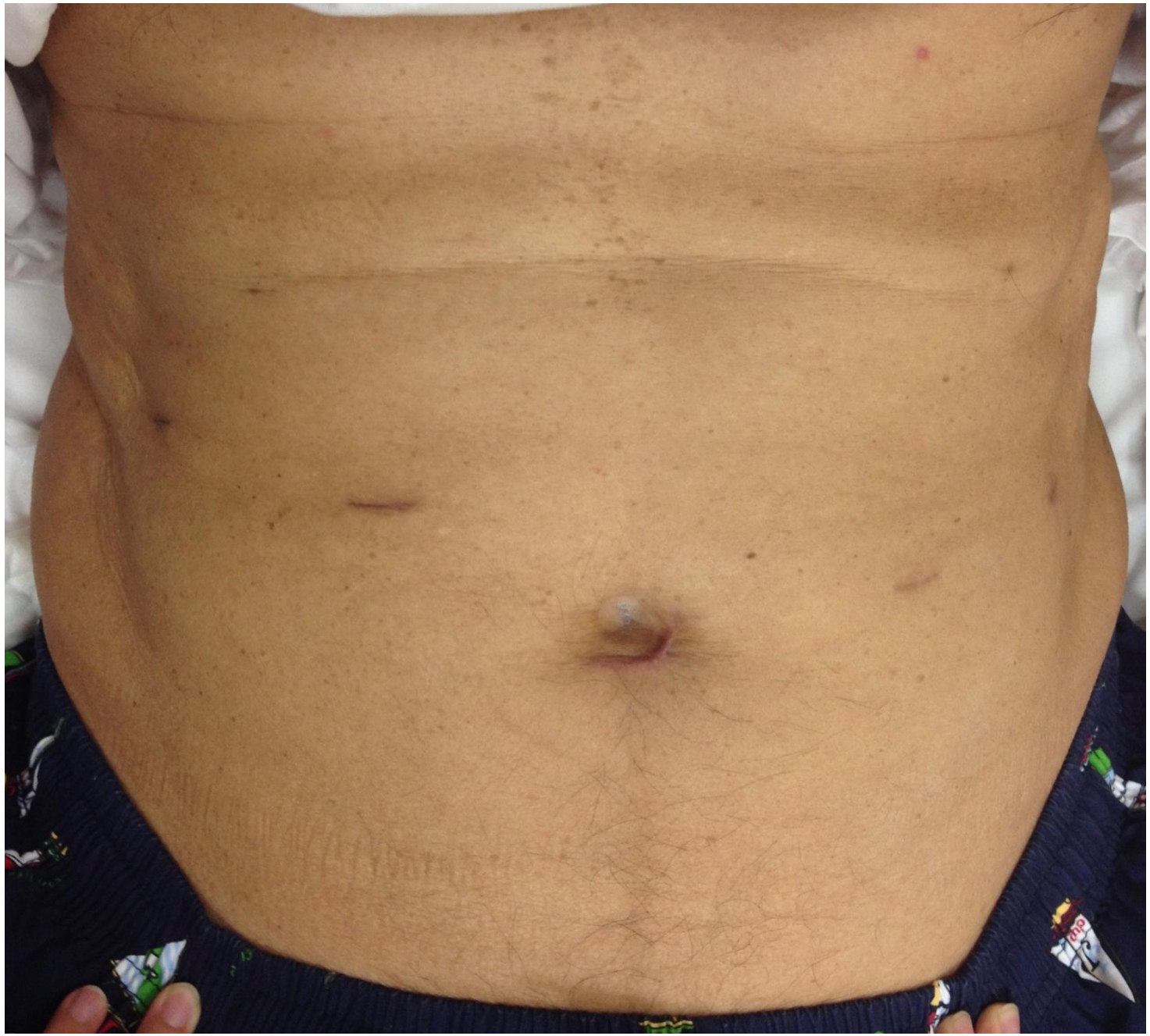
Laparoscopic Gastrectomy



Robotic



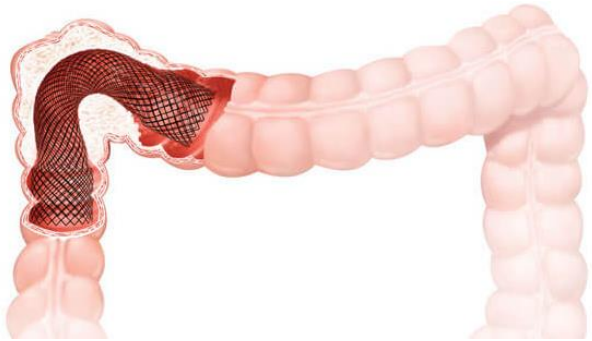
2 primary cancer

Treat poor prognosis first

Palliative care

PALLIATIVE SURGERY FOR CANCER

- Resection of a primary tumor for pain or bleeding

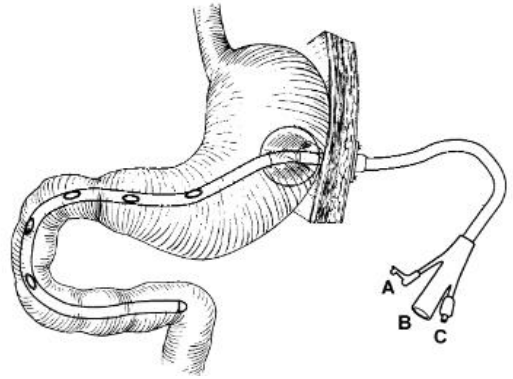


- Bowel resection for bleeding or obstruction
- Ostomy or Bypass for bowel obstruction (stent)
- Placement of a gastrostomy tube for decompression or enteral feedings
- Placement of a jejunostomy tube for enteral feedings or of a vascular access for hyperalimentation

METABOLICABNORMALITIES IN PATIENTS WITH CACHEXIA

- Decreased energy balance and increased glucose consumption
- Increased fat breakdown and serum lipid levels
- Increased gluconeogenesis and hepatic glucose production
- Increased muscle proteolysis and amino acid release
- Increased hepatic protein synthesis and amino acid transport
- Decreased nitrogen balance anddecreased muscle mass

ADVANTAGES OF ENTERALNUTRITION OVER PARENTERALNUTRITION



- Cost
- Maintains gut mucosal mass and barrier function
- Supports gut immune function
- Maintains a balanced luminal microflora environment

Para neoplastic Syndromes

- *Cushing's syndrome*

Lung, pancreatic, adrenal, and neural tumors

- *Syndrome of inappropriate ADH secretion*

Lung and intracranial tumors

- *Hypoglycemia*

Sarcomas, islet cell tumors, and hepatocellular carcinoma

- *Hypercalcemia*

Lung, breast, parathyroid, renal, myeloma, prostate, and ovarian cancers

- *Disseminated intravascular coagulation*

Pancreas, lung, stomach, and prostate

Palliation Pain

Medications

Nerve Block

Epidural Block

Celiac Ganglion Block: EUS guide

Pain Clinic

Terminal Care

Mode of Dead

Family plan

Conclusion

Surgical Oncologist → multidisciplinary approach to the prevention, diagnosis, treatment, and rehabilitation of cancer patients

Diagnosis → Biopsy (How to or How not) → Change treatment plan

Surgeon's Role in Modern Oncology → Modalities rather than from improved operative technique alone

Curative resection of primary cancers → R0 (Tumor and Lymph node)

Cytoreductive surgery is of benefit only when other effective treatments

Palliative surgery → obstruction, bleeding, perforation

Thank you