



CRS + HIPEC

Peritoneal Carcinomatosis: Is HIPEC the answer?

Ismail Al-Badawi,

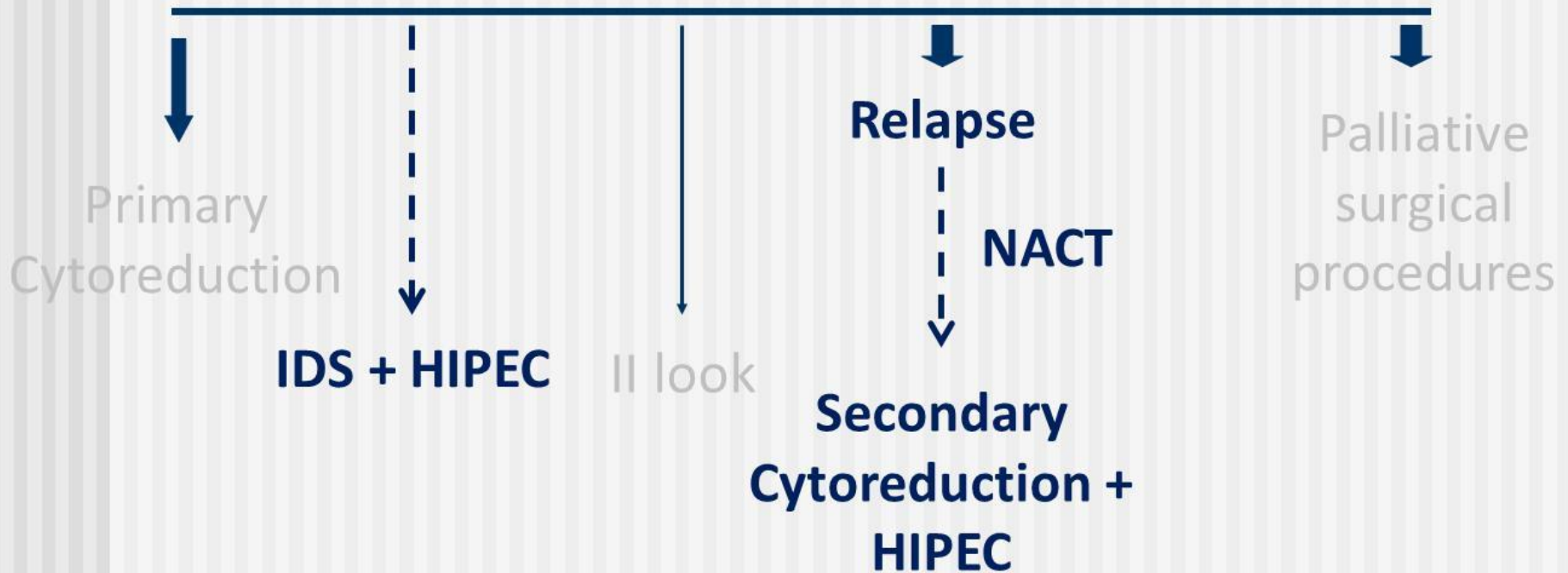
KFSH&RC

Riyadh, SA



HIPEC ROLE IN OVARIAN CANCER

HIPEC administration after induction chemotherapy





Hyperthermic Intraperitoneal Chemotherapy



THE PROBLEM IN THE WORLD

Region	Disease Type	Incidence of Disease (k)
USA Population: 300 M.	Colorectal	160.0
	Gastric	22.0
	Ovarian	23.0
	PMP	0.6
	PM	0.6
Total USA		206.2
Western Europe	Colorectal	280.0
	Gastric	82.0
	Ovaric	39.0
	PMP	0.8
	PM	0.8
Total WE		402.5
Total USA & WE		608.7
ROW Population:477 M.	Colorectal	1023.0
	Gastric	934.0
	Ovary	204.0
	PMP	9.5
	PM	9.5
Total ROW		2180.0
Total World		2788.7



GOALS OF CYTOREDUCTION

- **Remove all visible tumor (impossible)**
- **Try to leave only tumor nodules of 1 to 2 mm**
- **During this process there is significant spillage of tumor cells throughout the abdomen**



Dr Paul Sugarbaker is the pioneer of HIPEC

It was started in the early 1980's in Washington, USA





Candidates suitable for Cytoreductive Surgery and HIPEC

- **Pseudomyxoma Peritonei**
- **Appendiceal Tumours**
- **Mesothelioma**
- **Gastric Cancer**
- **Ovarian Cancer**
- **Uterine Cancer**
- **Colorectal Cancer**
- ❖ **(patient's with lung or distant mets are not candidates for HIPEC)**



— Gynecological Cancer —

—HIPEC—



The New York Times

March 11, 2011

Are Ovarian Cancer Patients Receiving Inadequate Treatment?

Most women with ovarian cancer receive inadequate care and miss out on treatments that could add a year or more to their lives, a new study has found....

**Dr. Robert E.
Bristow**

“If we could just make sure that women get to the people who are trained to take care of them, the impact would be greater than that of any new chemotherapy drug or biological agent. “



HIPEC ROLE IN OVARIAN CANCER: Rationale

Intraperitoneal therapy for peritoneal tumors: biophysics and clinical evidence

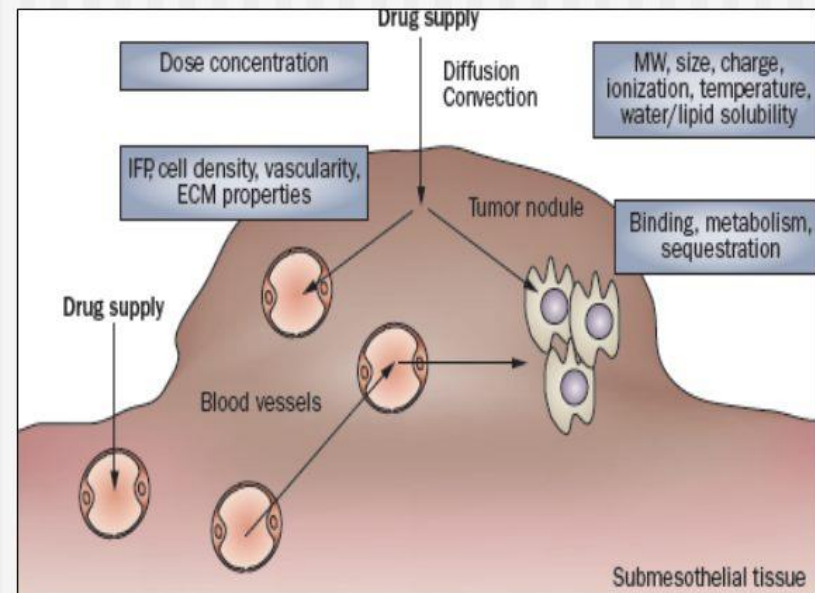
NATURE REVIEWS | CLINICAL ONCOLOGY

VOLUME 7 | FEBRUARY 2010

Wim P. Ceelen and Michael F. Flessner

➤ **Intravenous drug administration** is associated with a **limited submesothelial penetration** (40-50 μ m) due to the presence of the **peritoneal plasma barrier** and the **high interstitial pressure** of tumor tissues

➤ **Intraperitoneal drug delivery** increases peritoneal penetration up to 3-5 mm according with the molecular weight of the compound



Alberts DS, NEJM, 1996

Markman M, JCO, 2001

Armstrong DK, NEJM, 2006



HIPEC ROLE IN OVARIAN CANCER: Rationale

Intraperitoneal therapy for peritoneal tumors: biophysics and clinical evidence

Wim P. Ceelen and Michael F. Flessner

➤ **Hyperthermia** has been proved to enhance cytotoxicity of anticancer drugs including alkylating agents, platinum compounds, and doxorubicin

Issels RD, EJC 2008

➤ Furthermore, **hyperthermia** increases tumor blood supply and oxygenation of exposed tissues, thus resulting in increased tissue penetration and sensitivity to chemotherapy and radiation therapy

Sun XR, Radiother Oncol 2008



HIPEC ROLE IN OVARIAN CANCER: Rationale

✓ *Association with cytoreductive surgery*

✓ *Implementation of drug delivery, with a more direct targeting of intraperitoneal microscopic foci*

✓ *Less chemotherapy related systemic side-effects*

✓ *Reduction of the lag-time to post-surgery chemotherapy*

...but which clinical evidences for HIPEC in AOC



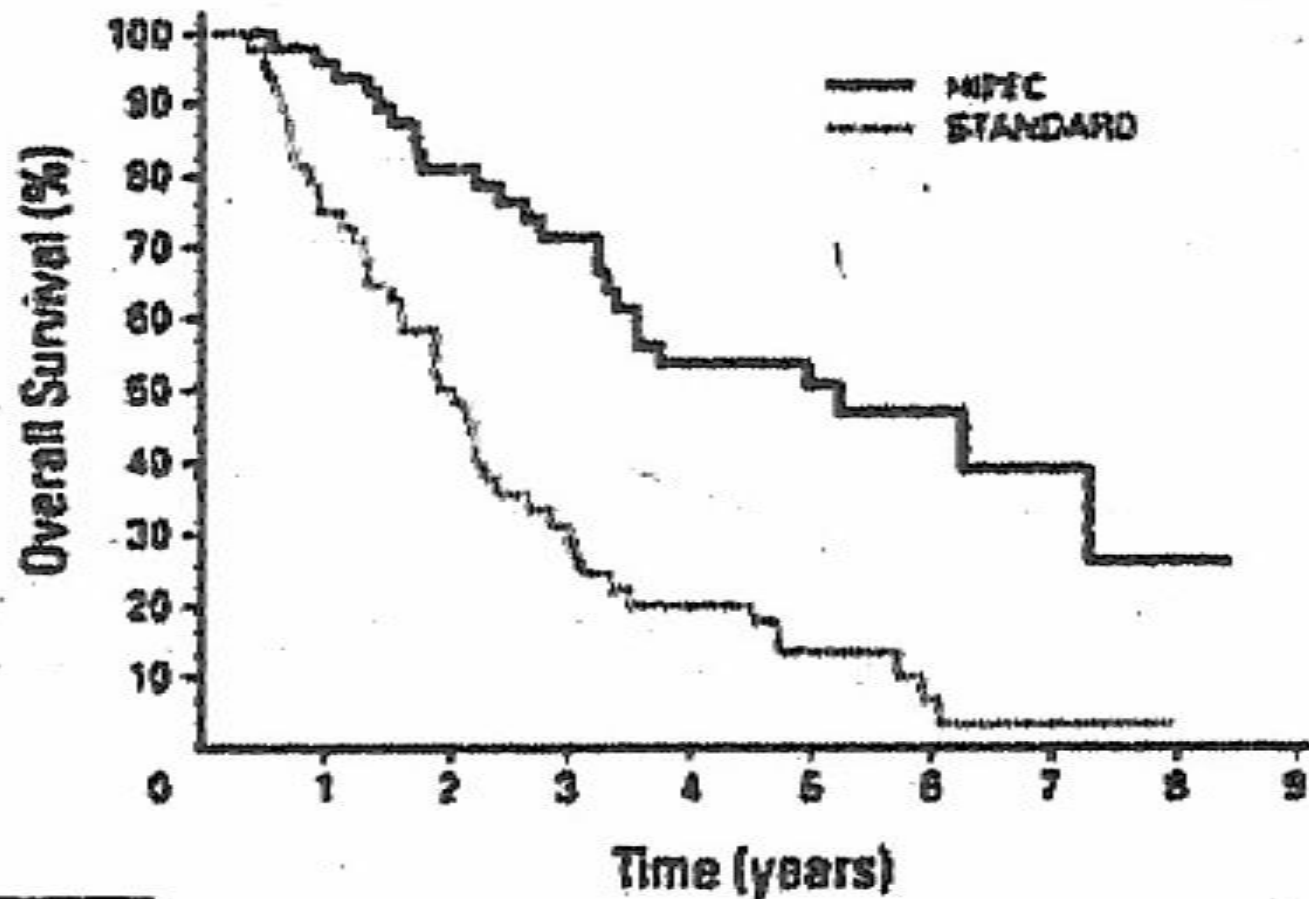


HIPEC ROLE IN OVARIAN CANCER:

State of the Art

<i>Author (Journal)</i>	<i>Year</i>	<i>Pts</i>	<i>Clinical Setting</i>	<i>Type of study</i>	<i>IP Drug</i>
Argenta (<i>Gynecol Oncol</i>)	2013	10	Recurrence	Pilot study	CBDA
Bakrin (<i>EJSO</i>)	2013	36	IDS	Retrospective series	CDDP, MMC
Bakrin (<i>Ann Surg Oncol</i>)	2012	246	Recurrence/Persistence	Retrospective series	CDDP, MMC
Celeen (<i>Ann Surg Oncol</i>)	2013	42	Recurrence/Persistence	Retrospective series	OXA
Deraco M (<i>Gynecol Oncol</i>)	2011	26	Primary	Phase II	DOX, CDDP
Melis A (<i>Bull Cancer</i>)	2011	43	Primary	Retrospective series	CDDP
Fagotti A (<i>Gynecol Oncol</i>)	2011	41	Recurrence	Phase II	OXA
Munoz-Casares (<i>Cancer Chemother Pharmacol</i>)	2011	10	Primary	Retrospective series	PTX
Parson (<i>Am J Surg</i>)	2011	51	Primary	Retrospective series	MMC, CDDP, PTX
Frenel (<i>J Surg Oncol</i>)	2011	31	Primary/Recurrence after NACT	Pilot study	OXA
Roviello (<i>J Surg Oncol</i>)	2010	53	Primary/Recurrence	Retrospective series	CDDP
Pomel (<i>EJSO</i>)	2010	31	Consolidation	Retrospective series	OXA
Carrabin (<i>Bull Cancer</i>)	2010	22	IDS/Recurrence	Retrospective series	CDDP
Lim (<i>Ann Surg Oncol</i>)	2009	30	Primary/IDS	Retrospective series	CDDP
Pavlov MJ (<i>Eur J Surg Oncol</i>)	2009	56	Primary/Recurrence	Retrospective series	DOX, CDDP
Guardiola E (<i>World J Surg Oncol</i>)	2009	47	Primary	Retrospective series	CDDP
Raspagliesi F (<i>EJSO</i>)	2006	40	Primary/Recurrence	Retrospective series	CDDP+MMC, CDDP+DOX

CDDP= cisplatin; DOX= doxorubicin; MMC=mitomicin-C; 5FU= 5-fluoruracil; DTX= docetaxel; CBDA=carboplatin; OXA=oxaliplatin; PTX=paclitaxel



Overall survival after CCRS + HIPEC or standard systemic chemotherapy for peritoneal carcinomatosis (from Elias et al.¹³).



HIPEC ROLE IN OVARIAN CANCER

Ongoing randomized clinical trials comparing HIPEC Vs no-HIPEC after debulking surgery

Protocol (NCT)	Clinical Setting	Phase (pts to be enrolled)	IP Regimen	Study End date
Korea Cancer Institute (1539785)	Optimally debulked (RT≤1cm) newly diagnosed EOC	II/III (170)	CDDP 75 mg/msq	2013
CHORINE-Italy (1628380)	Stage IIIC unresectable EOC after NACT	III (94)	CDDP 100mg/msq+ PTX 175mg/msq	2014
OVHIPEC-Netherlands (426257)	Stage IIIC-IV unresectable or suboptimally debulked (RT>1cm) EOC after NACT	III (280)	CDDP 100mg/msq	2013
HORSE-Italy (1539785)	Upfront Platinum Sensitive Recurrent EOC	III (158)	CDDP 75 mg/msq	2015
MSKCC-USA (1767675)	Upfront Platinum Sensitive Recurrent EOC	II (98)	CBDA 1000mg/msq	2018
CHIPOR-France (1376752)	Platinum Sensitive Recurrent EOC after NACT	III (444)	CDDP 100mg/msq	2018



Part 1

Cytoreductive Surgery (CRS)

- Total abdominal parietal peritonectomy
- Colectomy – hemicolectomy, anterior resection, greater omentectomy, splenectomy, cholecystectomy, Liver resection, TAH, BSO, resection of any bulky disease



Part 2

Intraperitoneal Chemotherapy

Objective

- Maximize the dose intensity of the drugs on tumour cells
- Minimizing their systemic toxicity

Advantages

- Chemotherapy given in one session
- Direct contact of higher concentration (75 – 1000 times greater)
- High concentration of chemotherapy administered under anaesthesia – less side effects to patients



Our Experience of CRS+HIPEC —

Gynecologic Oncology Section

KFSH&RC, Riyadh, Saudi Arabia



Birth of HIPEC in KFSHRC

- **Dr. Amin is the first surgical Oncologist introduced HIPEC surgery in KFSH&RC**
- **The Perfusionists and Dr. Amin went to Milan for training in the use of the RAND perfusion machine.**
- **Dr Amin went to UK to observe the HIPEC procedure for 6 months**
- **The first case was done in November 2008 in KFSH Riyadh**





KFSH&RC Experience

November 2008 — Current

- 277 patients (186 females, 91 males)
- 290 procedures
- 13 repeat HIPEC (4 colon, 4 appendix, 1 sarcoma, 4 ovary, 1 uterine)
- Age range 17-72 years
- Most patients middle age (40-60)
- No in-hospital mortality (all patients went home postop)
- Hospital stay, 1 week – 4 months
- PCI range 2-27



Cases	Number	Death in follow-up
Colon	101	7
Gastric	22	4
Mesothelioma	2	1
Sarcoma	3	1
GIST	3	1
Appendix	50	1
Uterine	8	-
Ovary	82	4
Iry peritoneal ca	1	-



Set-Up

- **Perfusion support**
- **Pharmacy support**
- **OR nursing support, training, safety issues**
- **Collaboration medical oncology**
- **Collaboration gynecologic surgical oncology**
- **Anesthesia support**
- **ICU support**
- **Urology support**





SAFETY



- **Chemo safety supplies – spill kits, PPE**
- **Cytotoxic Precaution signs were hung on the OR doors prior to the start of perfusion.**
- **Prior to the administration of the chemo drug personnel remaining in the room wore chemo gowns, shoe covers, chemo plus gloves, N95 masks and eye protection.**
- **Orange chemo waste bags**
- **Cytotoxic waste containers were placed in the room**
- **Enviro-sorb absorbent floor pads placed around the OR table**



Our Experience of CRS+HIPEC — Gynecologic Oncology at KFSH&RC

- **November 2008 — Current**
- **90 HIPEC cases for all gynecologic neoplasms (82 ovary & 8 Uterus)& 33 PseudoMyxoma Peritonii**
- **82 HIPEC cases for malignant ovarian tumors — primary or recurrent tumors with peritoneal carcinomatosis**
- **HIPEC cytotoxic agents: cisplatin (50 mg/m²) and doxorubicin (15 mg/m²)**



Basic Inclusion Criteria for HIPEC

- **Karnofsky performance status > 50%**
- **Satisfactory hematological, hepatic, coagulation, renal, electrolyte profiles**
- **Proof of PC from primary or recurrent Ovarian, Peritoneal or Endometrial carcinoma**
- **No proof of distant metastatic foci**
- **Signed written informed consent by patient**



Characteristics of Patients

Characteristic	n
Age:	
< 40 years	22
> 40 years	48
Histology:	
Surface epithelial-stromal tumor	60
Sex-cord stromal tumor	7
Germ cell tumor	3
Tumor grading:	
Well	14
Moderate	12
Poorly	39
Unknown	5
Initial FIGO stage:	
Stage I-II	39
Stage III-IV	41



Details of CRS+HIPEC

Characteristic	n
Peritoneal cancer index (PCI) score:	
< 18	41
> 18	29
Cytoreduction completeness:	
CC-0	59
CC-1	11
CC-2	6
CC-3	4
Operation time (CRS+HIPEC):	
< 9 hours	54
> 9 hours	16
Hospital stay:	
< 14 days	29
14-21 days	14
> 21 days	7
Blood loss:	
< 4 liters	59
> 4 liters	14



Procedures Performed during CRS+HIPEC

Procedure	n
USO	30
BSO	41
TAH	31
Total colectomy	9
Right colectomy	17
Left colectomy	13
Low anterior resection	34
Small bowel resection	21
Greater omentectomy	33
Lesser omentectomy	28
Splenectomy	59

Procedure	n
Cholecystectomy	36
RUQ peritonectomy	18
LUQ peritonectomy	23
Right diaphragmatic stripping	22
Left diaphragmatic stripping	21
Pelvic peritonectomy	43
Total gastrectomy	18
Sub-total gastrectomy	12
Glisson's capsule resection	21
Wedge liver resection	3



Postoperative Complications & Learning Curve

Characteristic	n
Complication grading:	
Grade I	74
Grade II	31
Grade III	21
Grade IV	8
Grade V (death)	0

Year	Number of CRS+HIPEC procedures	Number of postoperative complications (grade I-II)	Number of postoperative complications (grade III-IV)	Number of postoperative complications (grade V)
2008	4	41	11	0
2009	5	27	8	0
2010	8	16	6	0
2011	9	11	2	0
2012	10	6	1	0
2013	16	4	1	0



Postoperative Complications

Procedure	n
Anastomotic leak	23
Atelectasis	47
Pneumonia	6
Pulmonary embolism	9
Cerebrovascular accident	2
Sepsis	4
DIC	7
Intestinal perforation/fistula	3
Urinary disturbance	12
HIPEC chemotherapy-related toxicity	2
Others	19



**Cytoreductive Surgery and Hyperthermic
Intraperitoneal Chemotherapy for the Management
of Peritoneal Carcinomatosis from Primary and
Recurrent **Endometrial Carcinoma****

**Ahmed Abu-Zaid, Ayman Azzam, Osama AlOmar,
Hany Salem, Tarek Amin, Ismail A. Al-Badawi**

**Conclusion: CRS+HIPEC is a well-tolerated and
feasibly promising management modality in PC
from primary and recurrent endometrial
carcinoma. Further research is needed.**



THE JOURNAL OF
Obstetrics and Gynaecology Research

**Cytoreductive Surgery and Hyperthermic
Intraperitoneal Chemotherapy for the Management
of Peritoneal Carcinomatosis from Primary and
Recurrent **Ovarian Granulosa Cell Tumour****

**Ismail A. Al-Badawi, Ahmed Abu-Zaid, Ayman
Azzam, Osama Alomar, Tarek Amin**

**Conclusion: CRS+HIPEC appear to be an
efficacious and morbidly well-tolerated
therapeutic modality for management of
recurrent/relapsed OGCTs. Long-term follow-up
data and further research are needed.**



Irish Journal of Medical Science

[Accepted for Publication]

- **Routine Ureteric Stenting before Cytoreductive Surgery plus Hyperthermic Intraperitoneal Chemotherapy in Managing Peritoneal carcinomatosis from Gynecologic Malignancies: A single-Center Experience**
- **Ismail A. Al-Badawi, Tarek Amin, Mohammed AlOtaibi, Osama AlOmar, Ayman Azzam, Ahmed Abu-Zaid, Hussam Abu Al-Shaar**



Gastroenterology & Research Practice

[Accepted for publication with some revisions]

- **Cytoreductive Surgery plus Hyperthermic Intraperitoneal Chemotherapy for Management of Peritoneal Sarcomatosis: A Preliminary single-Center Experience from Saudi Arabia**
- **Ahmed Abu-Zaid Ayman Azzam, Mohammed Abuzaid, Tusneem Elhassan, Naryman Albadawi, Lynn Alkhatib, Osama AlOmar, Abdullah Alsuhaibani, Tarek Amin, Ismail A. Al-Badawi,**



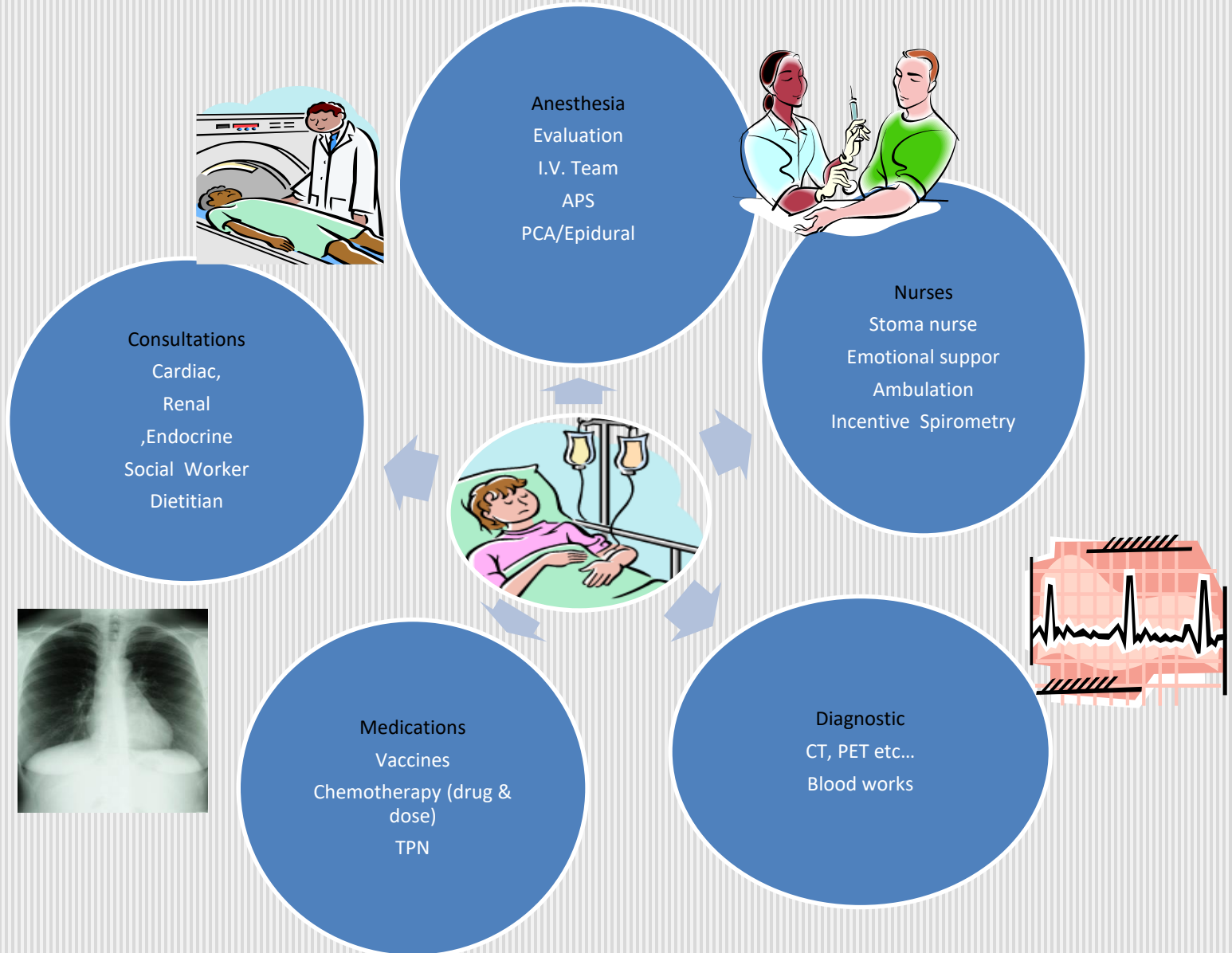
HIPEC

The pre-operative stage



Pre-operative work-up

Multi-Disciplinary Approach





RISKS TO PATIENT

- **Heat stroke syndrome** - extreme hyperthermia, typically above 40°C, associated with a systemic inflammatory response, which leads to multi organ damage with universal involvement of the CNS.
- **Chemotherapy toxicity** to kidneys, lungs, liver and bone marrow as well as organ damage secondary to hyperthermia





SURGERY





ANAESTHETIC PREPARATION OF THE PATIENT IN THE OR



- General and epidural anaesthesia
- BIS monitor
- CVP
- Arterial line
- TEE
- Nasopharyngeal temp probe
- Urine output monitoring



CYSTOSCOPY

- Prior to cytoreductive surgery
- 3 way Foley catheter inserted
- Cystoscopy and **insertion of bilateral ureteric stents**
- Stents were removed prior to patient leaving the OR



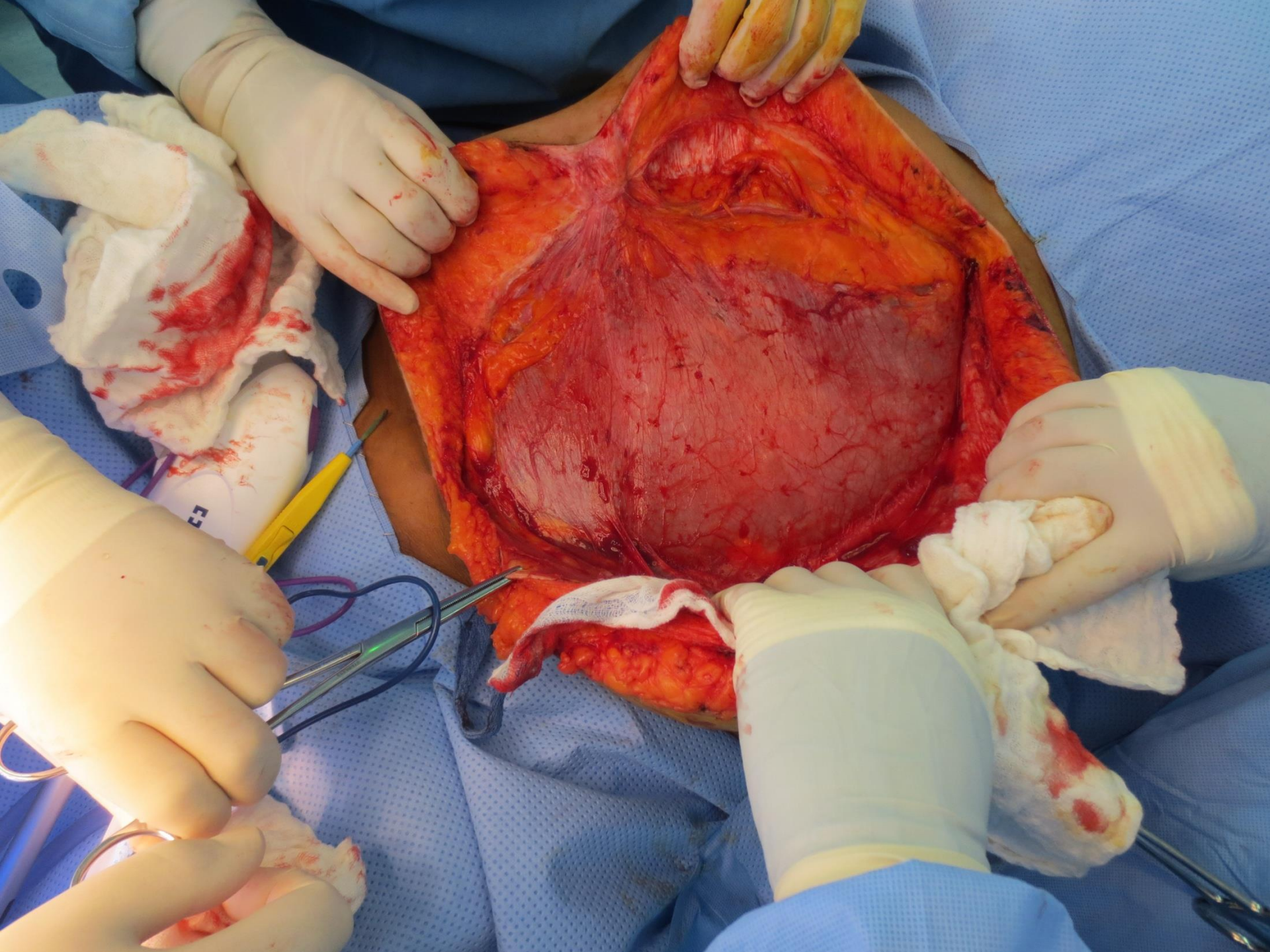


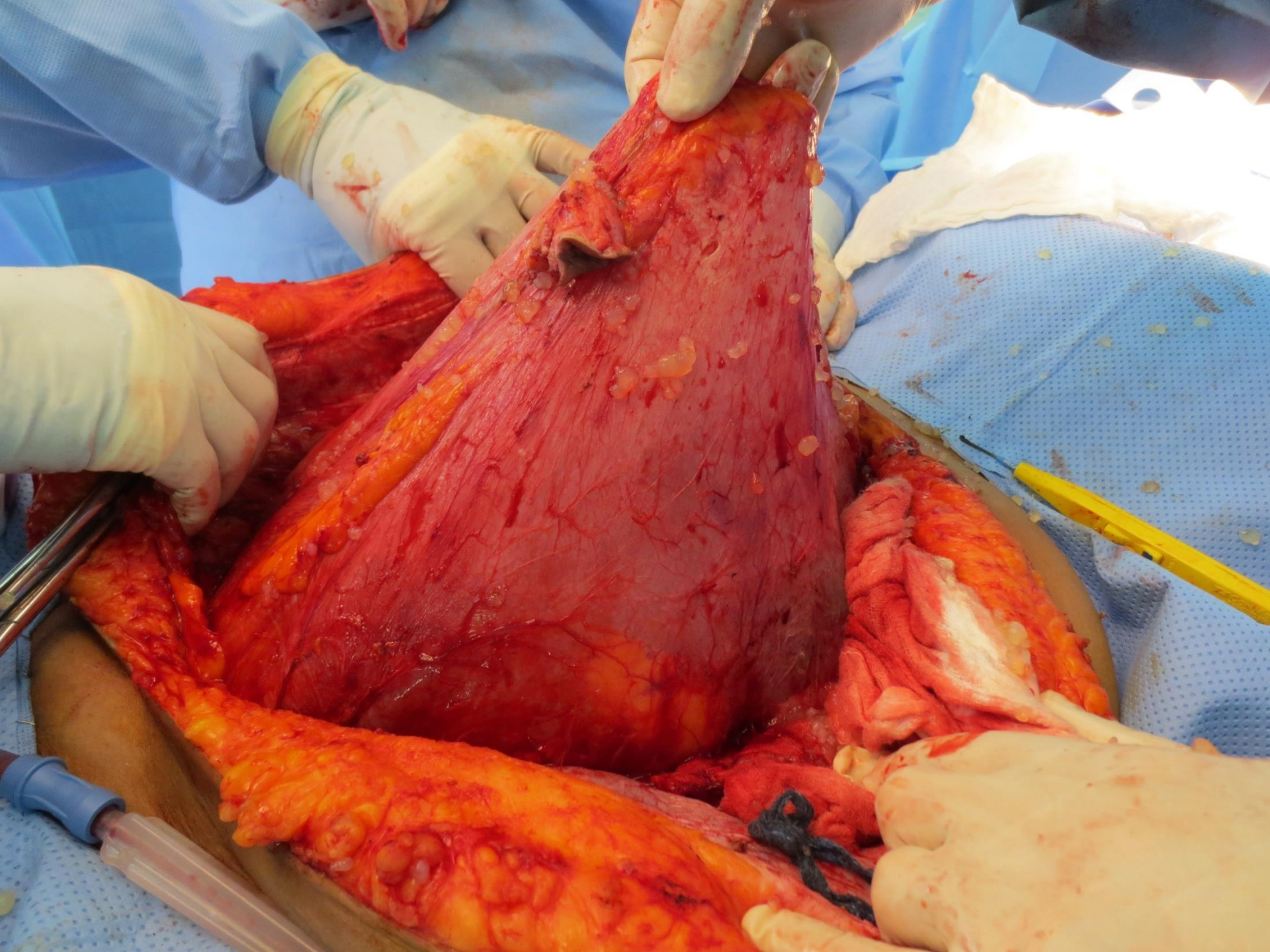
Intra operative picture

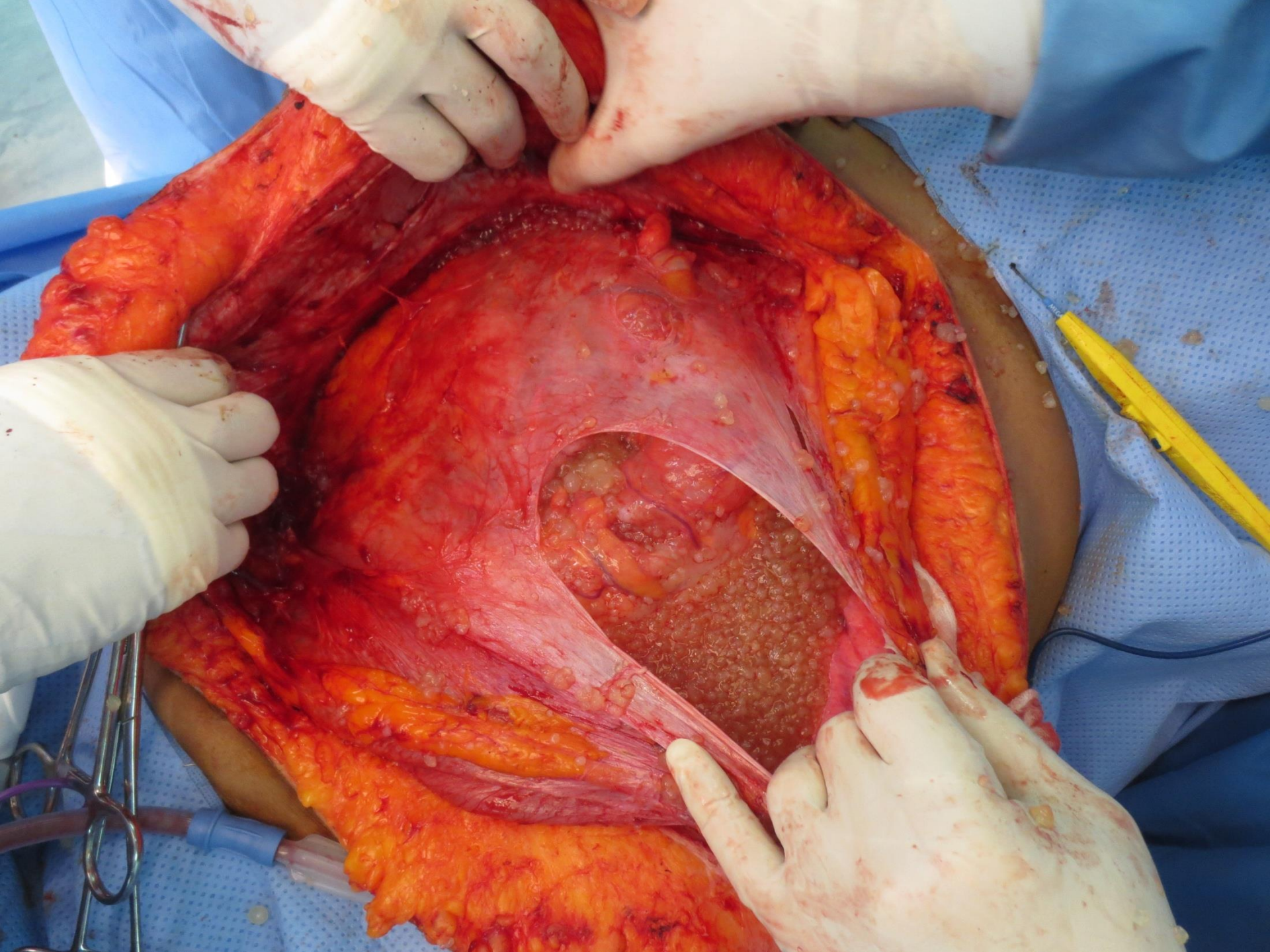


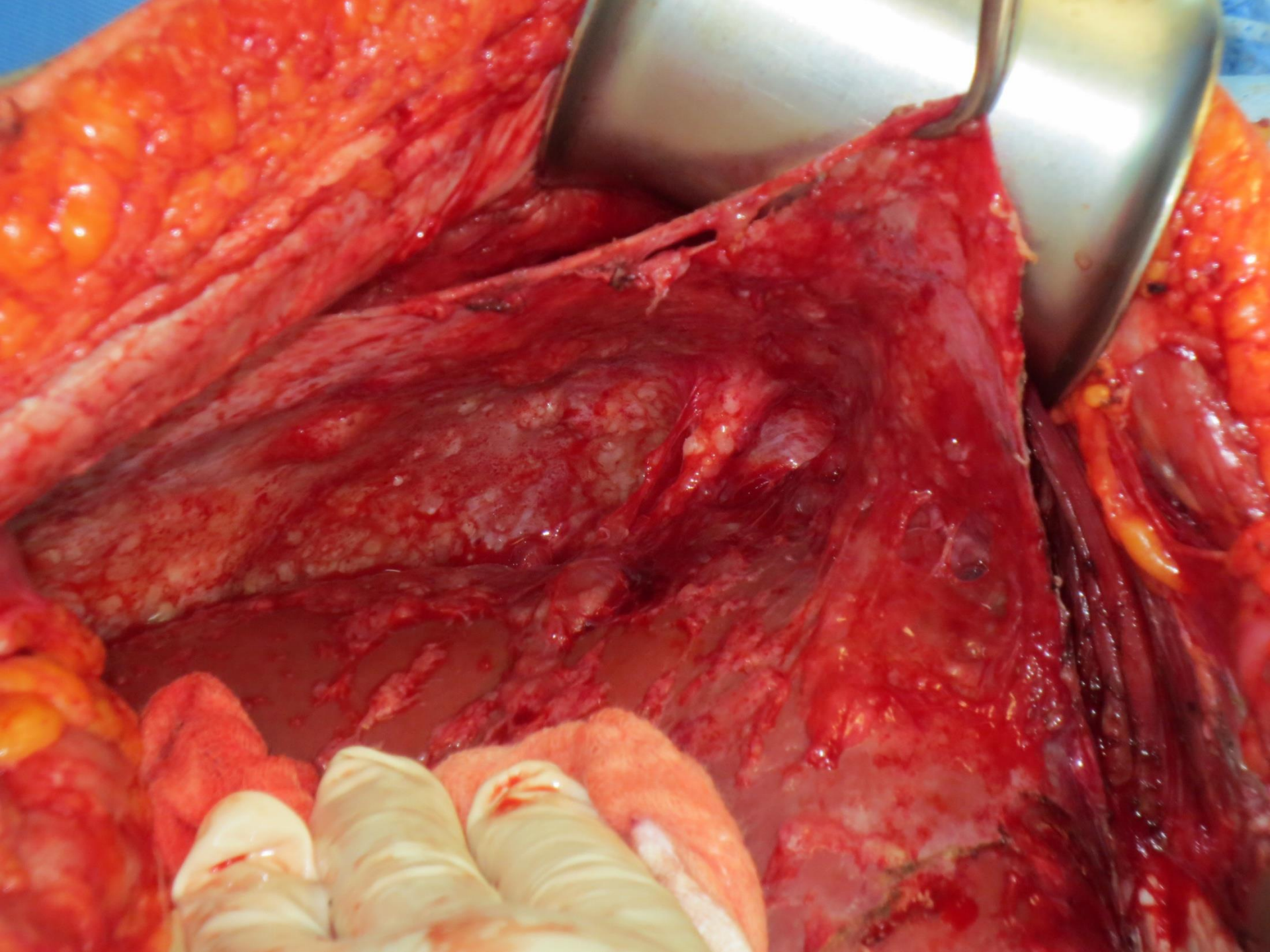


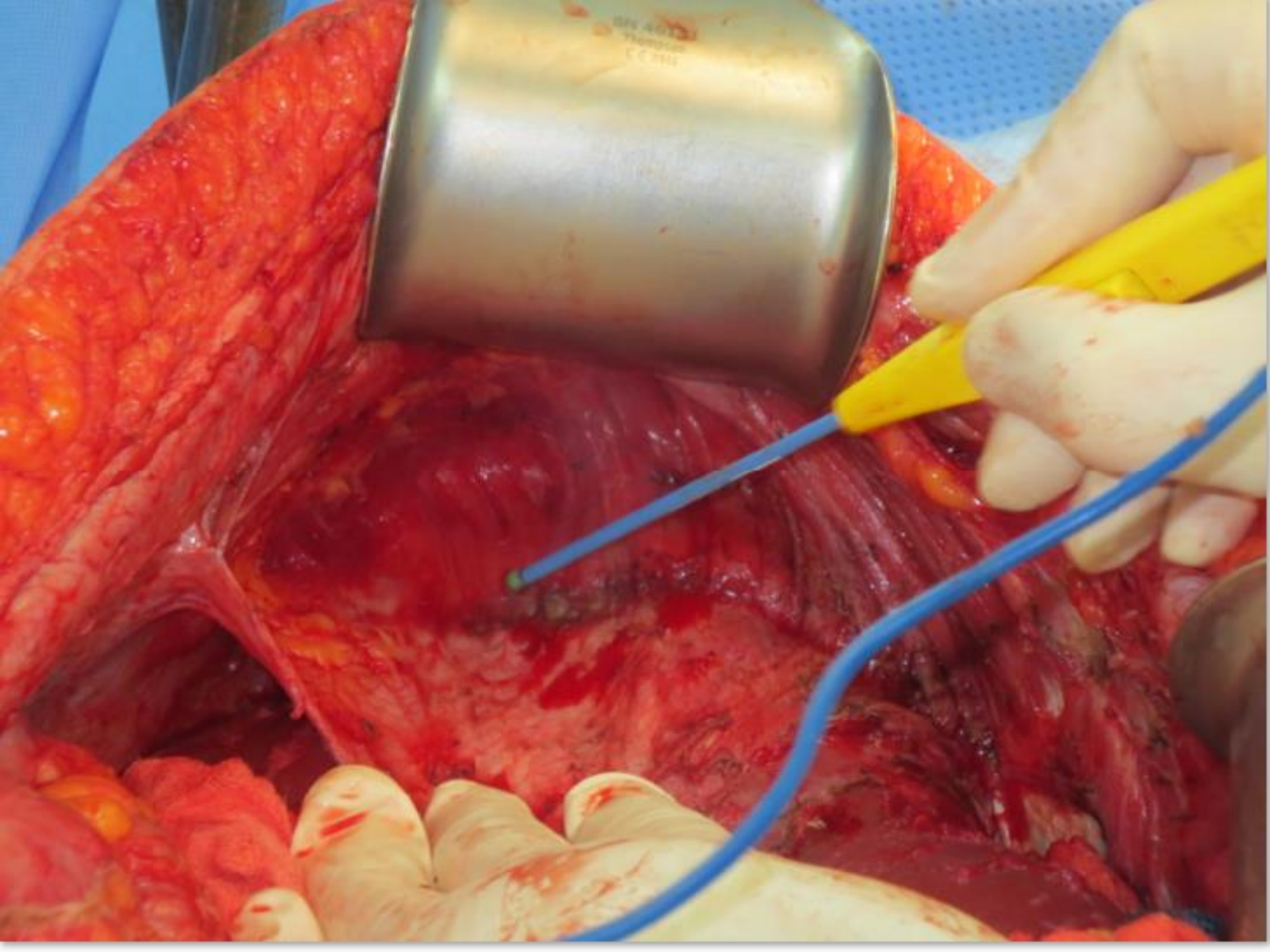














SUMMARY

- **Cystoscopy and stent insertion took approximately 30 minutes**
- **Cytoreductive surgery took approximately 6.5 hours**
- **Chemo administration, flush and drainage approximately 2 hours**
- **Closure of abdomen**
- **Patient transferred intubated to MSICU after 12.5 hours in theatre**
- **Anaesthetist requested full monitoring with MSICU bed i.e. CVP, Arterial BP, ECG, O₂ saturation,**
- **Handover given and MSICU staff advised to take chemo precautions**



HIPEC

Patient in the ICU



Admission to ICU

1. Communication – Good liaison with RT, Doctors, Nurses, Pharmacy and Housekeeping

2. Room Preparation and set up

- Room temperature control
- Equipment (blood warmer, infusion pumps, IV sets) and Chemo supplies
- Ventilator / Invasive monitoring
- Effective pain control
- **2:1 Nursing**
- Patient Instability
- Blood products administration
- Maintenance of drains and documentation





1st & 2nd day Post Op

- Full physical assessment
- Continuation of fluid resuscitation, blood product transfusion and electrolyte replacement
- Continuous Hemodynamic monitoring
- Urine output >120 hr with hydration
- Furosemide or CRRT to attain target U/O
- Effective pain control
- TPN and Insulin
- Daily X-ray and labs as ordered
- Sedation vacation, weaning and extubation pathway
- Doppler Ultrasound if ordered (suspicion of leak)
- 2nd day Mobility and Incentive Spirometry
- **When do you transfer out the patients, what POD?**



Preparation for Transfer

- **Full assessment**
- **Discharge criteria met (stable hemodynamics, labs)**
- **Pain control (APS involvement)**
- **Off precautions after 48hrs**
- **Patient and family Education**

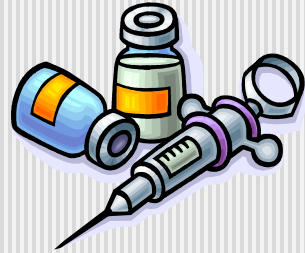
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POST OP CARE

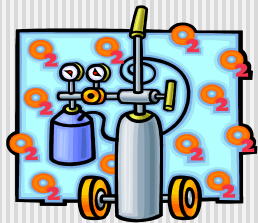


Pain Management
PCA
Epidural Analgesia
Switch to PO meds



nu109005 www.fotosearch.com

Wound care



Respiratory care
Incentive Spirometry
Nasal Canula
Chest X-rays
Chest drains care



Nutrition
NPO
TPN
Start PO/dietitian



Mobilizing
Mobility assessment
Early Ambulation
Physiotherapy





Post Op Complications

- **Studies have shown 25-30% most common small bowel fistulas (Folz et al 2004)**
- **Septic shock, respiratory, PE, Stroke, Peritonitis, acute renal failure**
- **Overall mortality rates low 0%-5%**
- **DVT**
- **Pulmonary embolus**
- **Paralytic ileus**
- **Enterocutaneous fistula**
- **Wound infection / dehiscence**

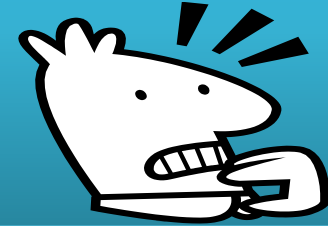


COST of HIPEC

**KFSH&RC, Average case cost
from admission to discharge =
100,000 SR**



Questions



- **Possible Timing for HIPEC**
- **Is it for Platinum sensitive OR resistant relapse**
- **Future perspectives**



Eur J Surg Oncol. 2013 Oct;39(10):1109-15

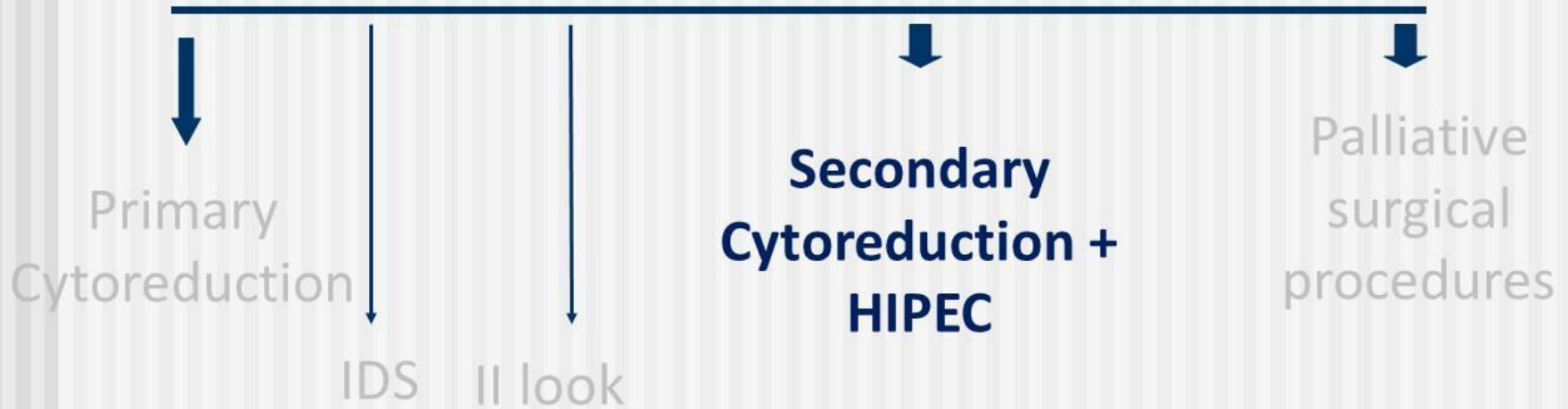
Cytoreductive surgery and hyperthermic intraperitoneal chemotherapy for the treatment of advanced epithelial ovarian carcinoma: Upfront therapy, at first recurrence, or later?

Gonzalez Bayon L, Steiner MA, Vasquez Jimenez W, Asencio JM, Alvarez de Sierra P, Atahualpa Arenas F, Rodriguez del Campo J, Garcia Sabrido JL



HIPEC ROLE IN OVARIAN CANCER

Which is the best clinical setting?

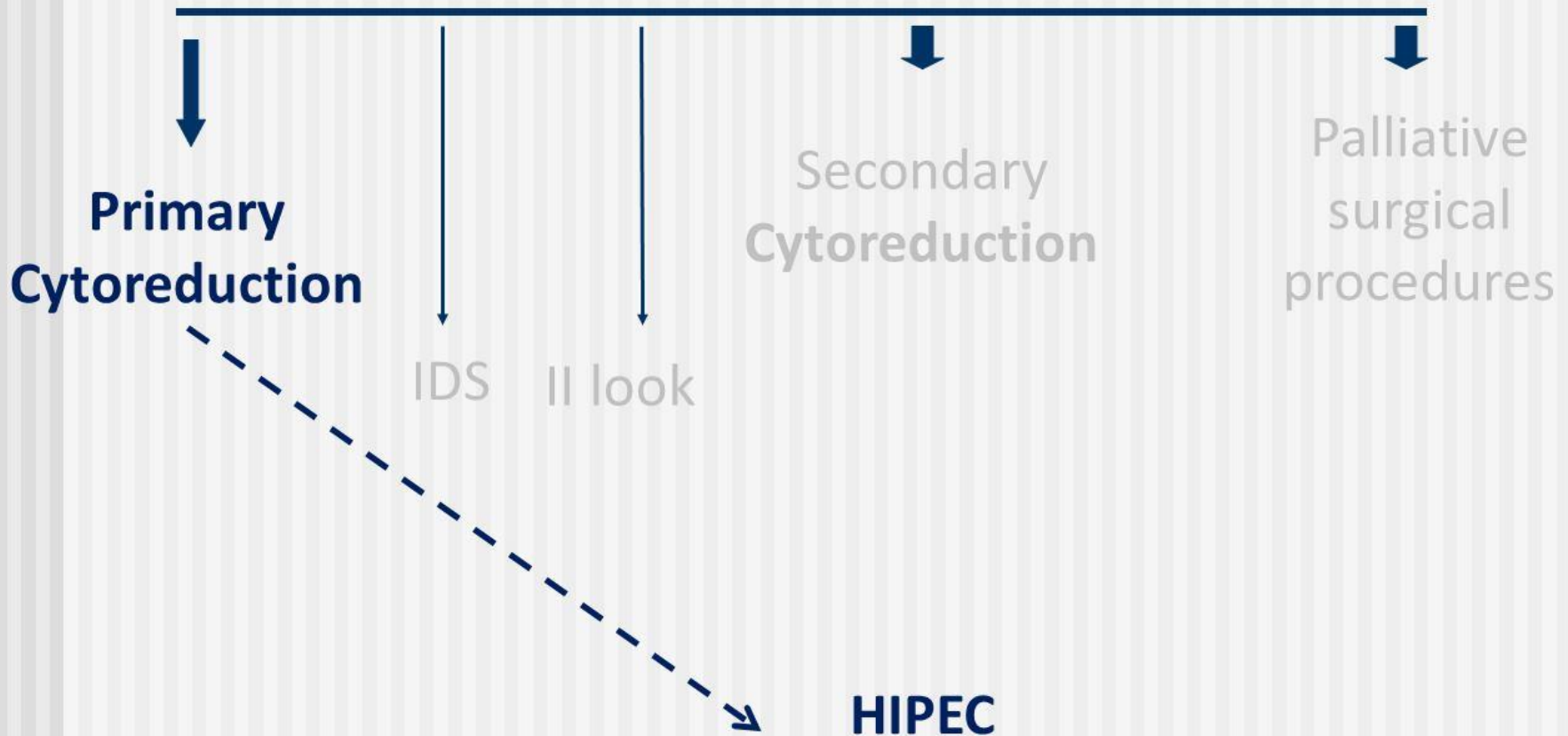


Recurrence is the natural field to test any therapeutic strategy before moving to first line approach. Recurrent platinum-sensitive AOC patients are very similar to naïve cases.



HIPEC ROLE IN OVARIAN CANCER

Incorporation of HIPEC in PDS



Cytoreductive surgery and hyperthermic intraperitoneal chemotherapy as upfront therapy for advanced epithelial ovarian cancer: Multi-institutional phase-II trial

Gynecologic Oncology 122 (2011) 215–220

Marcello Deraco^{a,*}, Shigeki Kusamura^a, Salvatore Virzi^b, Francesco Puccio^c, Antonio Macrì^d,
Ciro Famulari^d, Massimiliano Solazzo^c, Serena Bonomi^b, Domenico Rosario Iusco^b, Dario Baratti^a

Median follow-up: 25 months (range: 1–70)

16 patients: currently alive with no evidence of disease,

3 patients: alive with disease

6 patients died (one postoperative death)

IP chemo: Cisplatin-Doxorubicin

8 patients: peritoneal progression,

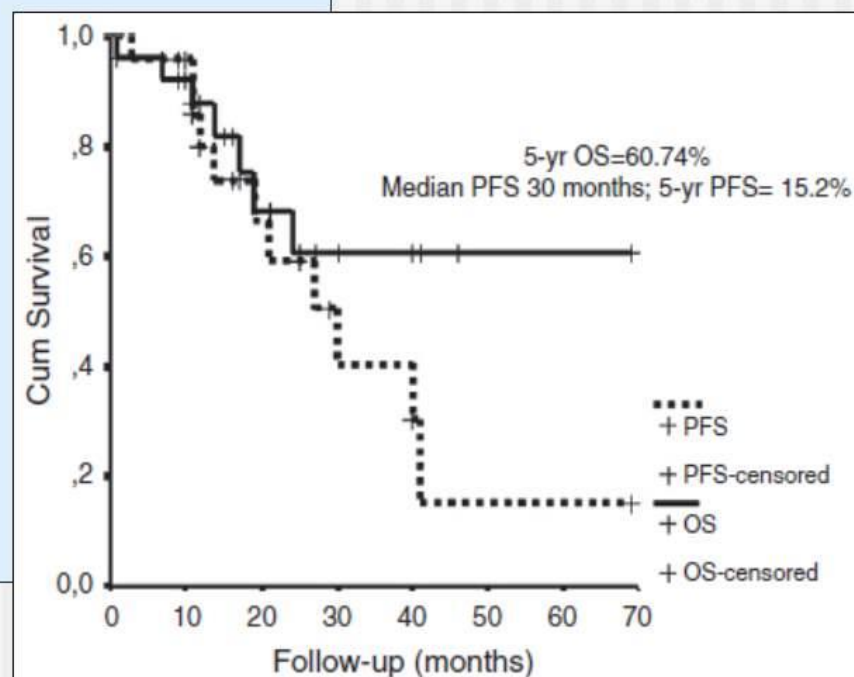
1 patient: liver progression;

Median PFS was 30 months

Median OS was not reached

Mortality rate: 4 %

Morbidity rate: 15 %



Cytoreductive Surgery and Hyperthermic Intraperitoneal Chemotherapy (HIPEC) for Persistent and Recurrent Advanced Ovarian Carcinoma: A Multicenter, Prospective Study of 246 Patients

N. Bakrin, MD¹, E. Cotte, MD¹, F. Golfier, MD, PhD², F. N. Gilly, MD, PhD¹, G. Freyer, MD, PhD³, W. Helm, MD, PhD⁴, O. Glehen, MD, PhD¹, and J. M. Bereder, MD⁵

Ann Surg Oncol (2012) 19:4052–4058

Characteristics	N (%)	Mean	Maximum	Minimum	SD
Age (year)	268	57.5	77.6	28.6	9
BMI	203	23.7	44.5	20	4.5
Prior chemotherapy	248	3.6	18	1	2.6
No. of procedures					
1	246 (91.7)				
2	20 (7.5)				
3	2 (0.7)				
PCI	260	10.8	30	1	7.3
CC score					
0–1	247 (92.2)				
2–3	21 (7.8)				

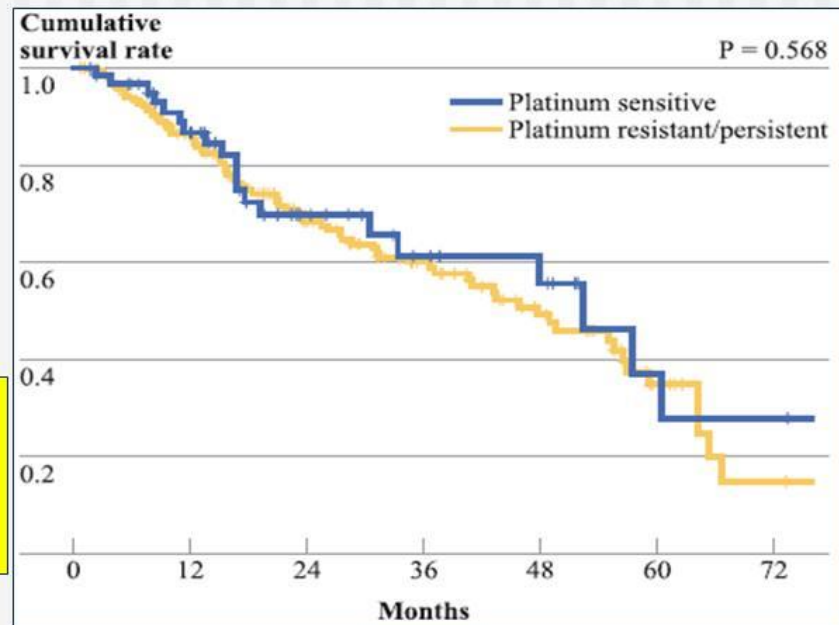
➤ Cisplatin was used alone, or in combination with doxorubicin or mitomycin C in 95.5% of cases

➤ Platinum Resistant: 62 (23.5%) patients

➤ Mortality and Morbidity rate were 0.37 and 11.6%

➤ Median OS was 48.9 months

No differences in term of OS between platinum sensitive and resistant relapse





HIPEC ROLE IN OVARIAN CANCER

Future Perspectives

We are moving from the conventional point of view, considering CS+HIPEC as a “last chance” “one-shot” treatment, to the integration of HIPEC with currently available MI approaches, such as laparoscopy and robotic surgery, to treat the disease several times along the natural history of OC.





HIPEC ROLE IN OVARIAN CANCER

Future Perspectives

HIPEC FOLLOWS THE EVOLUTION IN OVARIAN CANCER
CYTOREDUCTIVE SURGERY



CONVENTIONAL LPT



MIS

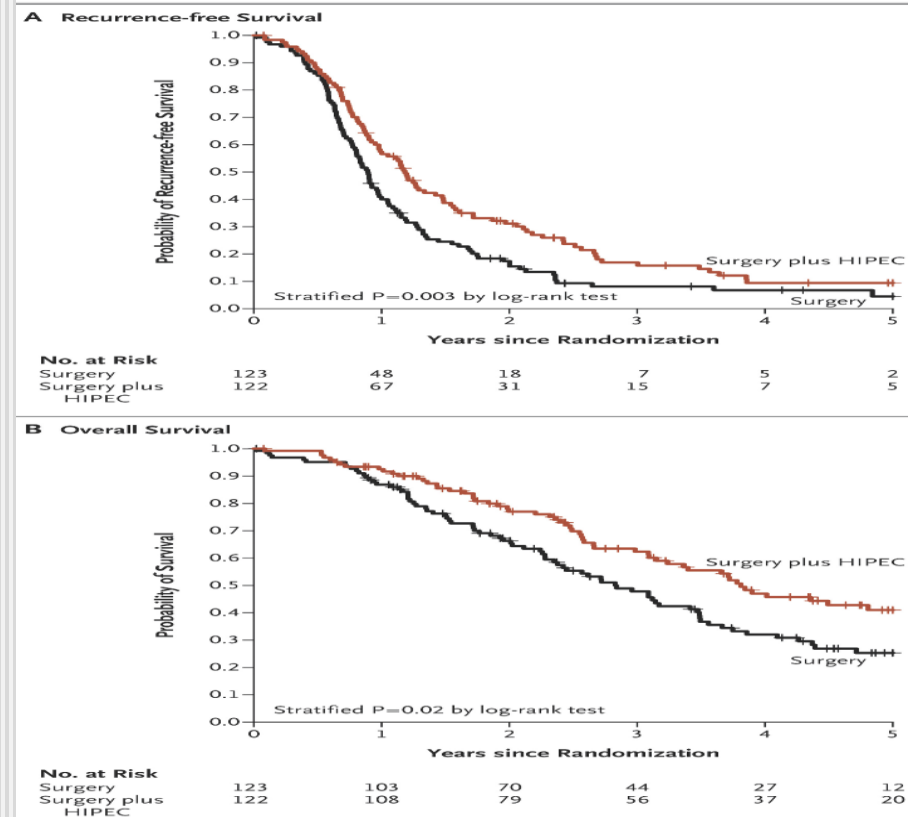


ORIGINAL ARTICLE

Hyperthermic Intraperitoneal Chemotherapy in Ovarian Cancer

Willemien J. van Driel, M.D., Ph.D., Simone N. Koole, M.D., Karolina Sikorska, Ph.D., Jules H. Schagen van Leeuwen, M.D., Ph.D., Henk W.R. Schreuder, M.D., Ph.D., Ralph H.M. Hermans, M.D., Ph.D., Ignace H.J.T. de Hingh, M.D., Ph.D., Jacobus van der Velden, M.D., Ph.D., Henriëtte J. Arts, M.D., Ph.D., Leon F.A.G. Massuger, M.D., Ph.D., Arend G.J. Aalbers, M.D., Victor J. Verwaal, M.D., Ph.D., [et al.](#)

The median recurrence-free survival was 10.7 months in the surgery group and 14.2 months in the surgery-plus-HIPEC group. At a median follow-up of 4.7 years, 76 patients (62%) in the surgery group and 61 patients (50%) in the surgery-plus-HIPEC group had died (hazard ratio, 0.67; 95% CI, 0.48 to 0.94; $P=0.02$). The median overall survival was 33.9 months in the surgery group and 45.7 months in the surgery-plus-HIPEC group. The percentage of patients who had adverse events of grade 3 or 4 was similar in the two groups



**REVIEW****Open Access**

The prognosis impact of hyperthermic intraperitoneal chemotherapy (HIPEC) plus cytoreductive surgery (CRS) in advanced ovarian cancer: the meta-analysis

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Abstract

Background and objective: Previous studies about the prognostic value of the HIPEC have yielded controversial results. Therefore, this study aims to assess the impact of HIPEC on patients with ovarian cancer.

Results: We included 13 comparative studies, and found that the overall survival (OS) and progression-free survival (PFS) in HIPEC groups were superior to groups without HIPEC treatment in the all total population (HR = 0.54, 95% CI: 0.45 to 0.66, HR = 0.45, 95% CI: 0.32 to 0.62). Additionally, the subgroup analysis showed that patients with advanced primary ovarian cancers also gained improved OS and PFS benefit from HIPEC (HR = 0.59, 95% CI: 0.46 to 0.75, HR = 0.41, 95% CI: 0.32 to 0.54). With regard to recurrent ovarian cancer, HIPEC was associated with improved OS (HR = 0.45, 95% CI: 0.24 to 0.83), but for the PFS, no correlation was observed between HIPEC group and the non-HIPEC group (HR = 0.55, 95% CI: 0.27 to 1.11). HIPEC also led to favorable clinical outcome (HR = 0.64, 95% CI: 0.50 to 0.82, HR = 0.36, 95% CI: 0.20 to 0.65) for stage III or IV ovarian cancer with initial diagnosis.

Conclusion: The review indicated that HIPEC-based regimens was correlated with better clinical prognosis for patients with primary ovarian cancers. For recurrent ovarian cancers, HIPEC only improved the OS but did not elicit significant value on the PFS.



Conclusion

Cytoreductive surgery with HIPEC is feasible and relatively safe in recurrent and primary PC from ovarian cancer.

Better selection of patients is the most important step

Evidence proven survival benefits

Higher center and teamwork is crucial

- NCCN guidelines may be offered
- ESGO still experimental and needs more prospective studies

• **ME Knowledge is knowing that a tomato is a fruit; wisdom is not putting it in a fruit salad."**

Miles Kington

