

# Advances in Liver Surgery

## 肝臟手術新進展

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# Liver Surgery 肝臟手術

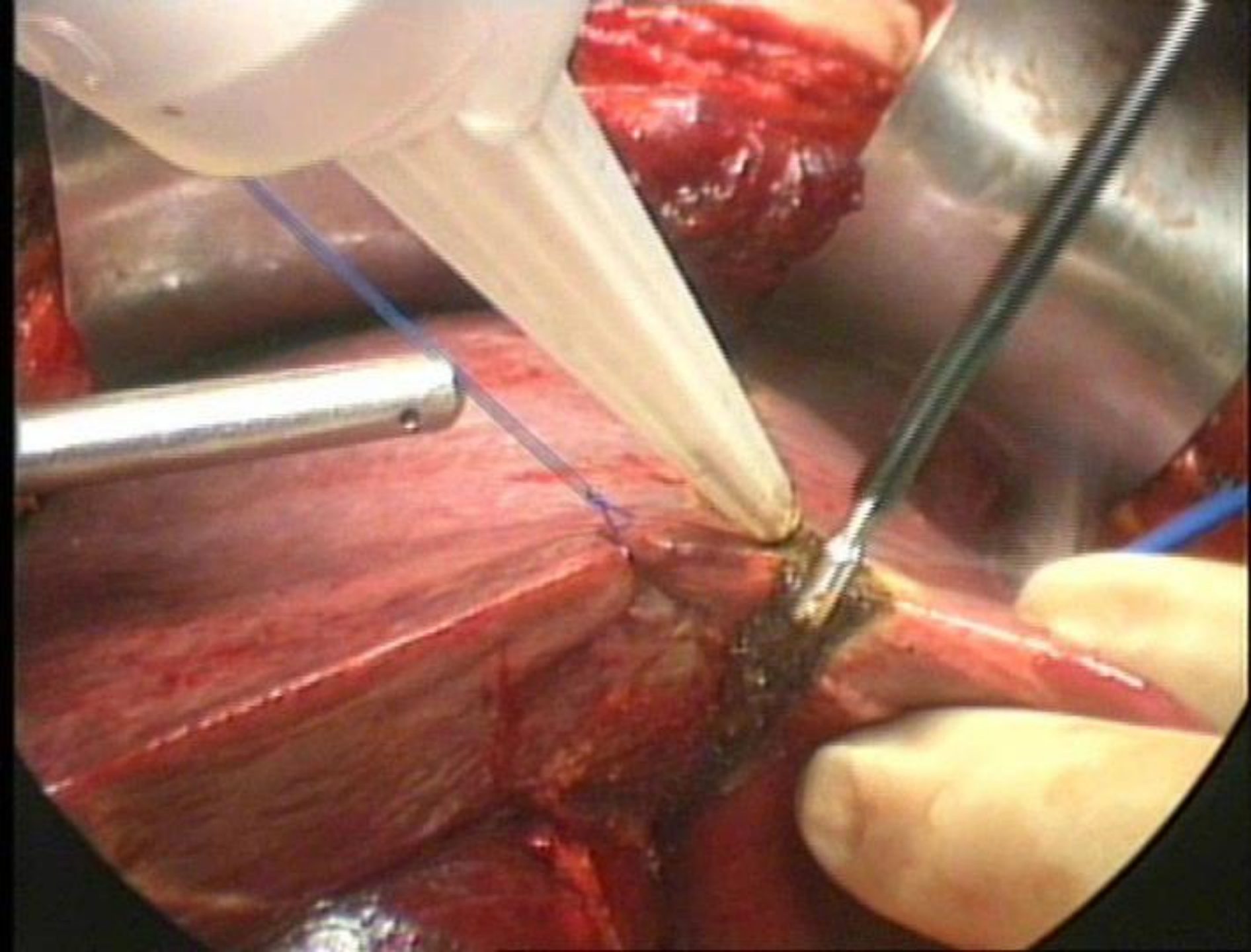
- Liver resection 肝臟切除
- Liver transplant 肝臟移植
- Local ablation of tumors 肝腫瘤局部消融術
- Surgical drainage of liver abscess 肝膿腫引流
- Surgery for liver cysts 肝囊腫手術
- Surgery for liver trauma 肝創傷手術

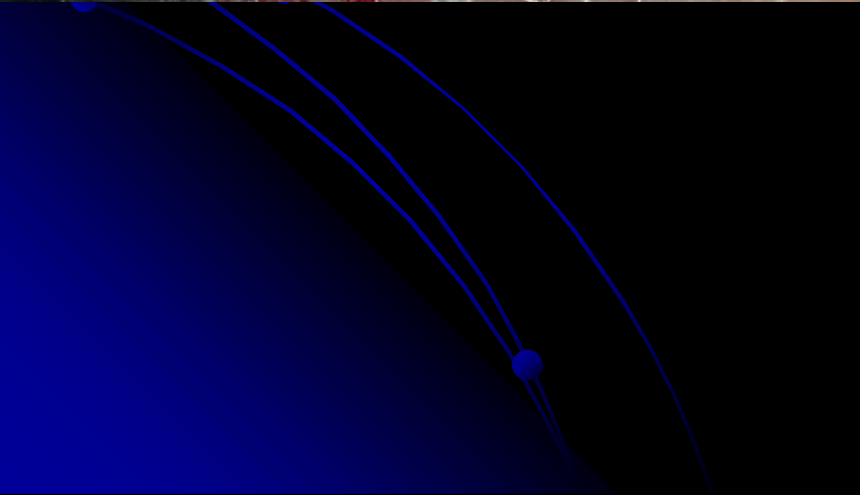
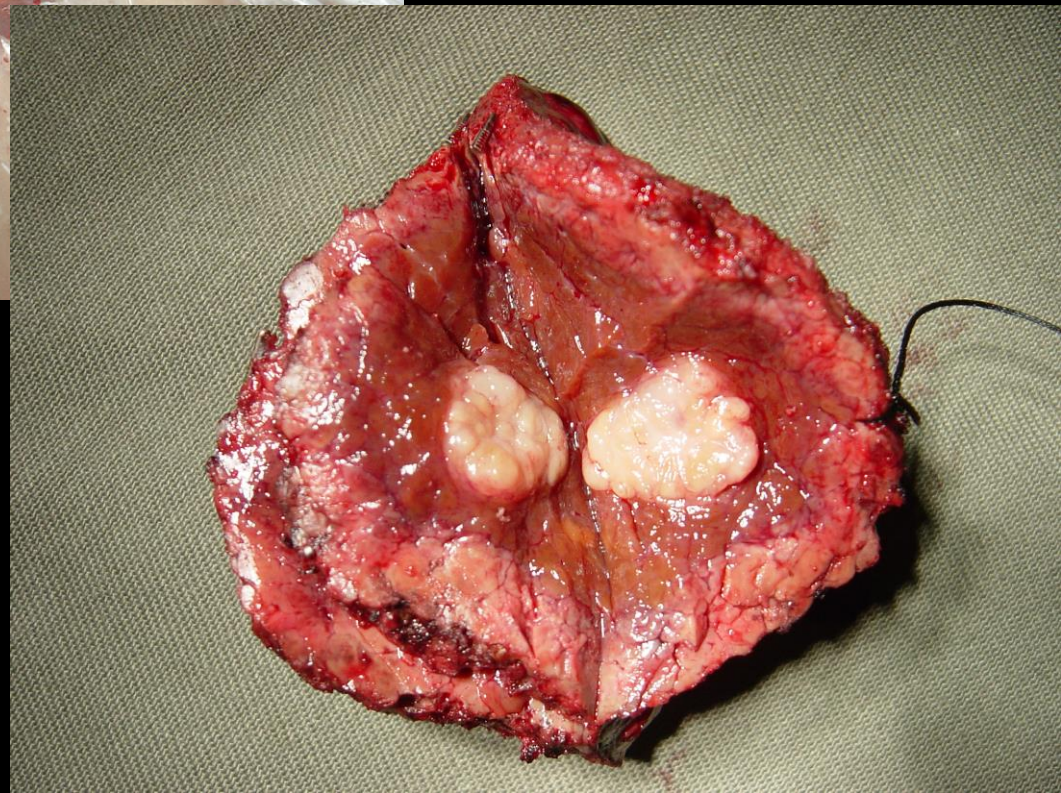
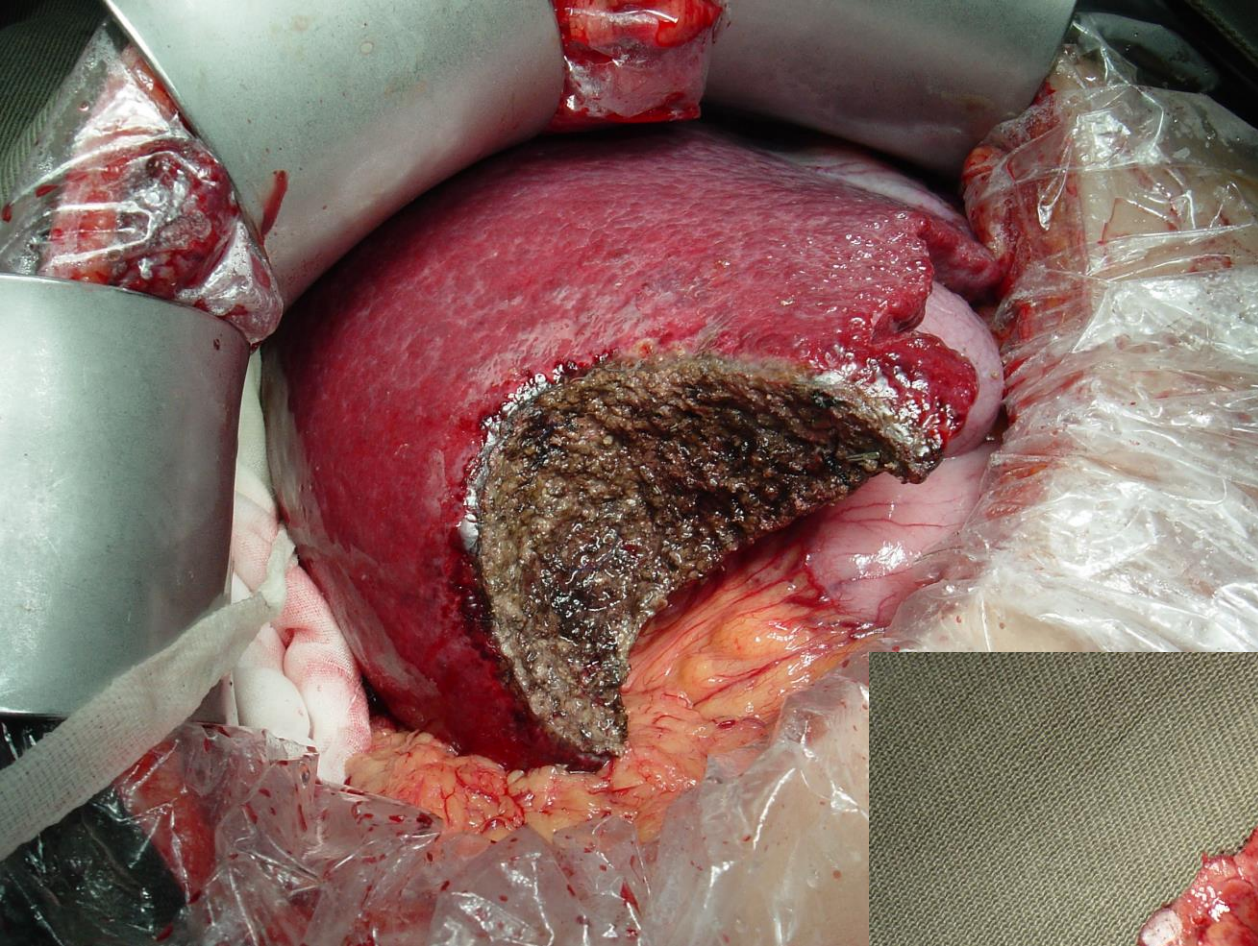
# Liver resection 肝臟切除

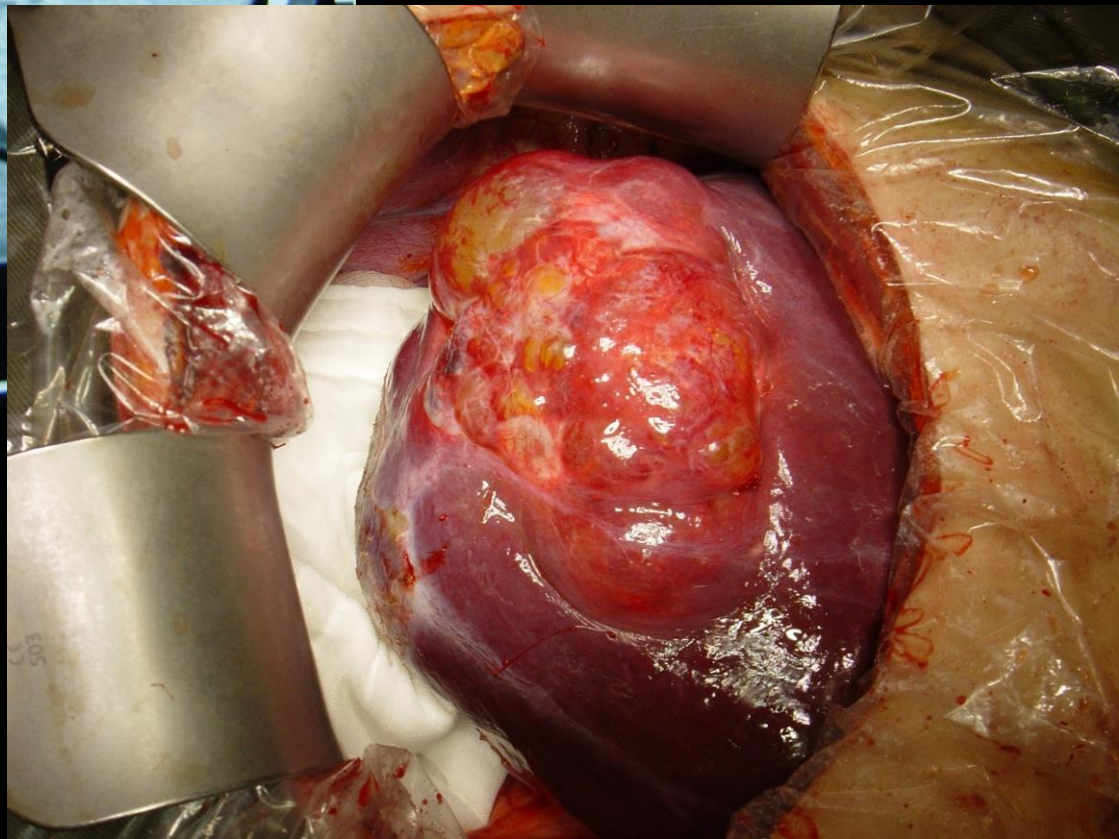
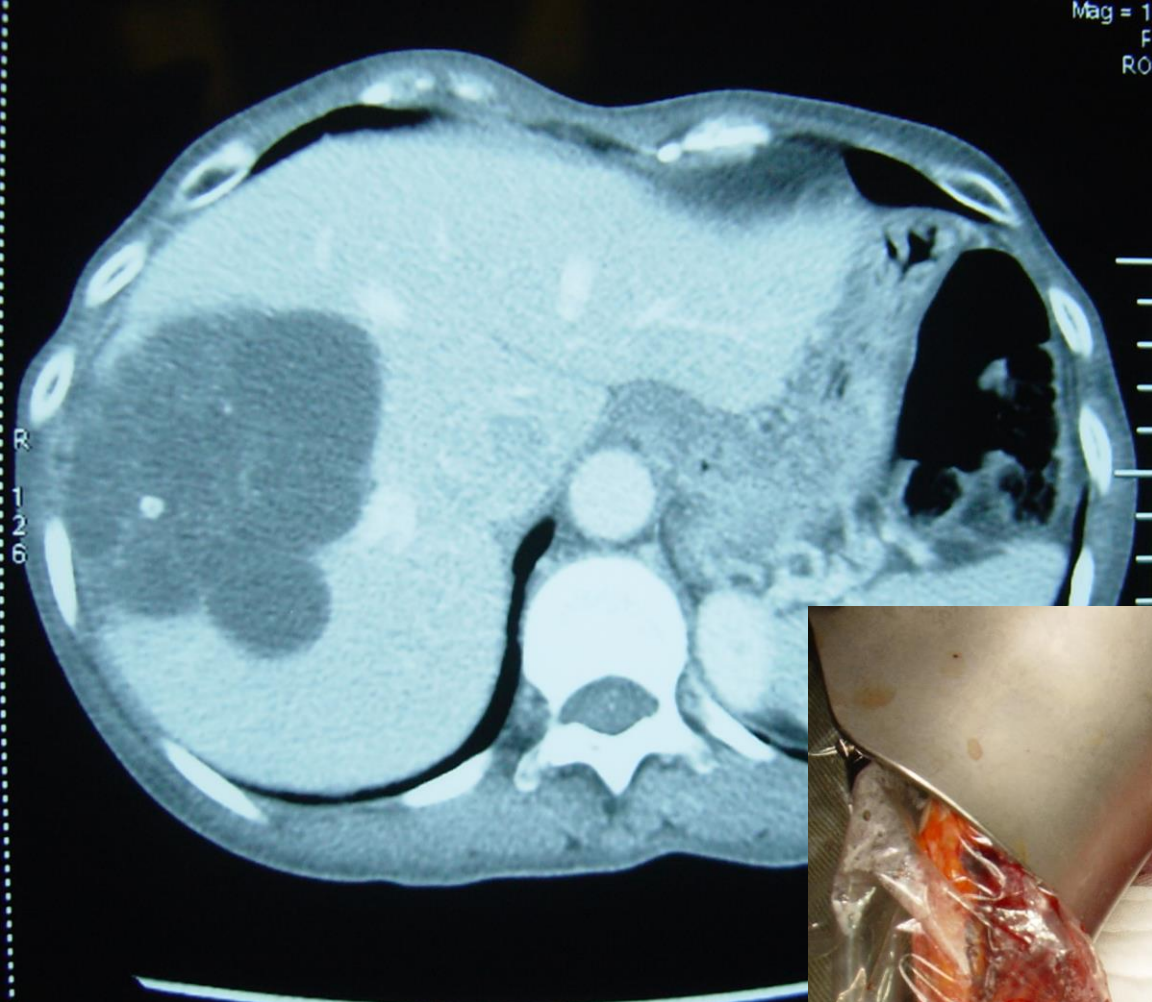
- Major or ultra-major operation in general surgery
- Traditionally associated with high mortality 死亡率 (>10%, up to 20-40%), significant morbidity 併發症發生率 (30-50%) and transfusion rate 輸血率 up to 60% for massive blood loss
- Most important risks: bleeding 出血, liver failure 肝衰竭, bile leak 膽漏 and intra-abdominal collection 腹腔積液
- With improvement of operative technique and surgical equipment, mortality 死亡率 can now be kept below 5% and blood transfusion rate 輸血率 around 10-20%

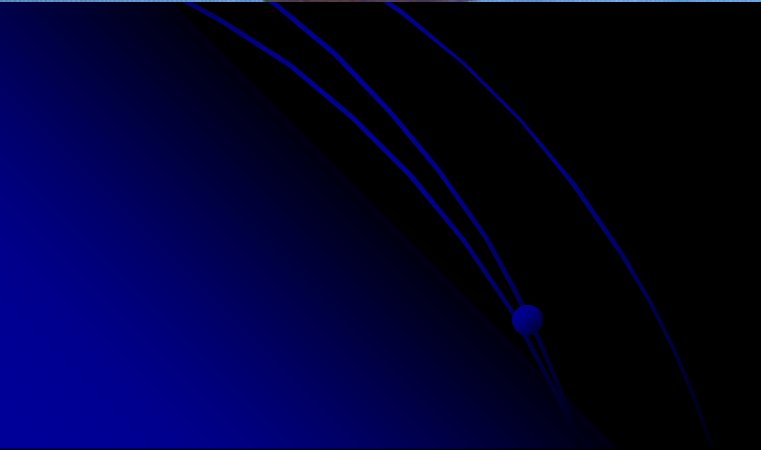
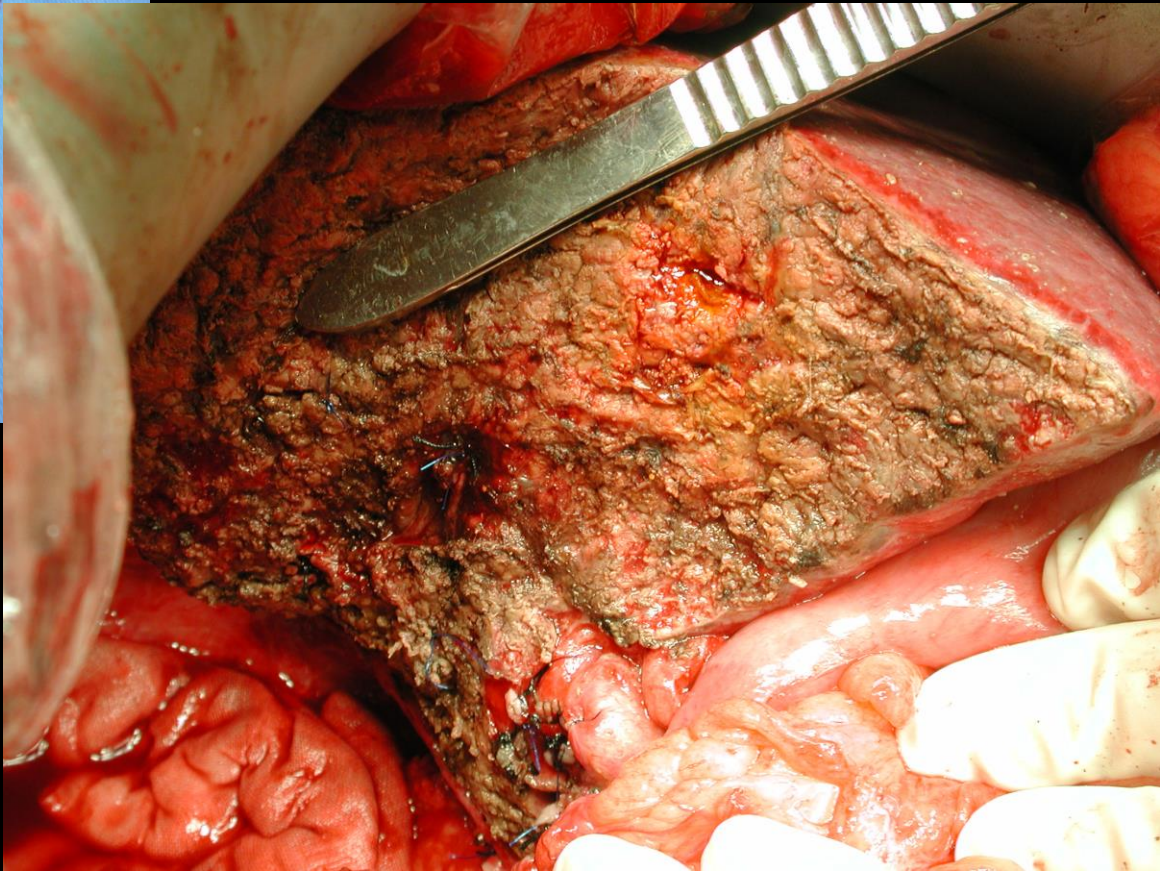
# Factors for better operative outcomes

- Patient selection
- More precise assessment of liver function
- Availability of other treatment options
- Low central venous pressure anaesthesia 低中央靜脈壓麻醉法
- New liver transection 斷肝 and haemostatic 止血 instruments
- Improved operative technique 手術技巧
- Improved post-operative care 術後護理











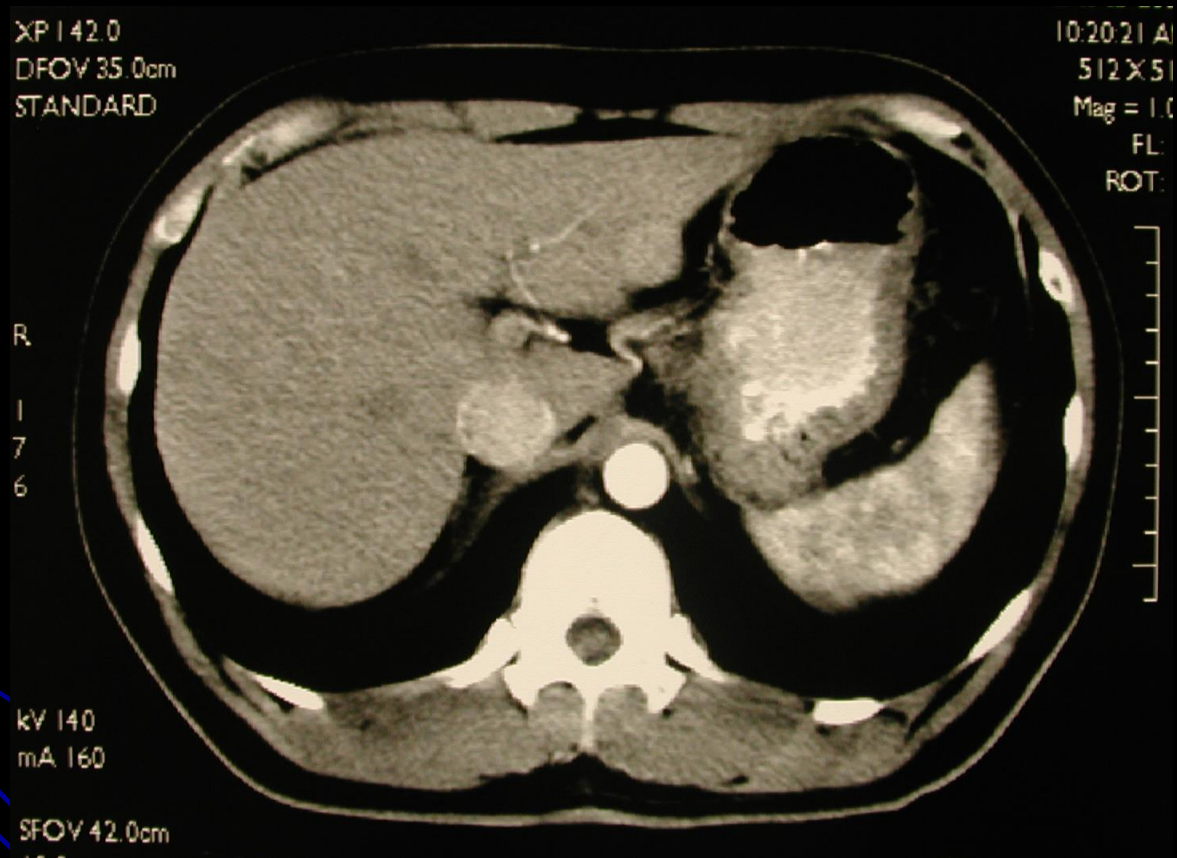
# Results of liver resection in PWH

## 肝臟切除

- June 2003 – May 2007
- 248 consecutive cases of hepatectomy 肝臟切除
- Operative mortality: 0.8%
- Operative morbidity: 25.4%
- Operative blood loss: 300ml (20-2700)
- Blood transfusion rate: 7.7%
- Postoperative hospital stay: 7 days (2-47)

# Minimally invasive surgery in liver resection 微創手術在肝切除的應用

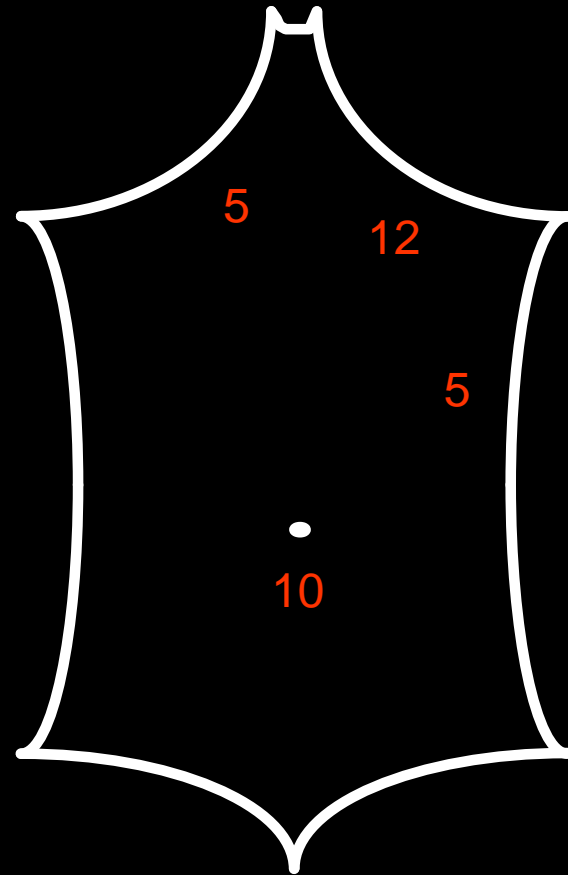
- Difficulty: control of bleeding, difficulty in retraction and exposure
- Concerns in malignant liver tumors 惡性瘤: oncological clearance 腫瘤的徹底切除, tumor seeding at port sites and peritoneum 腫瘤播種於傷口及腹膜

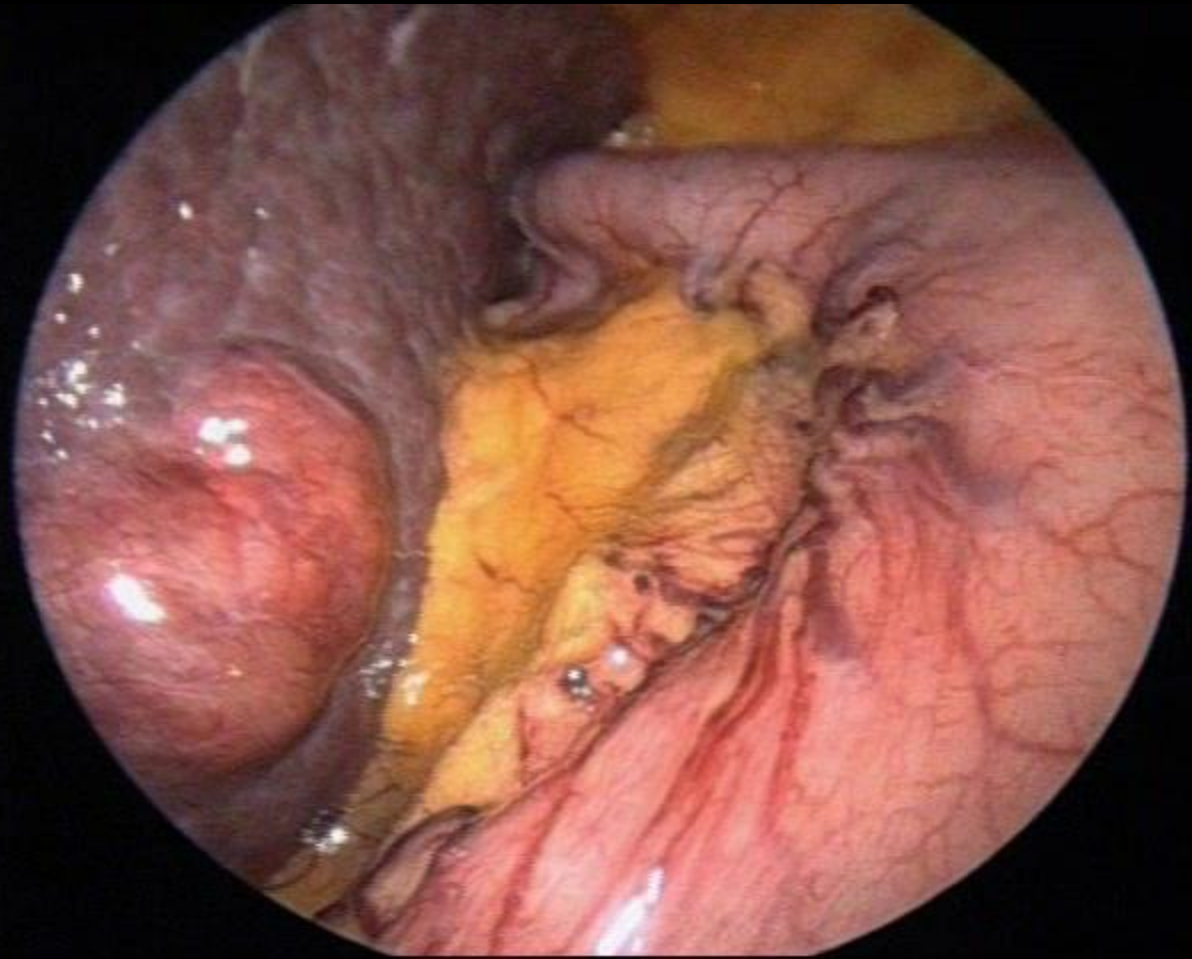


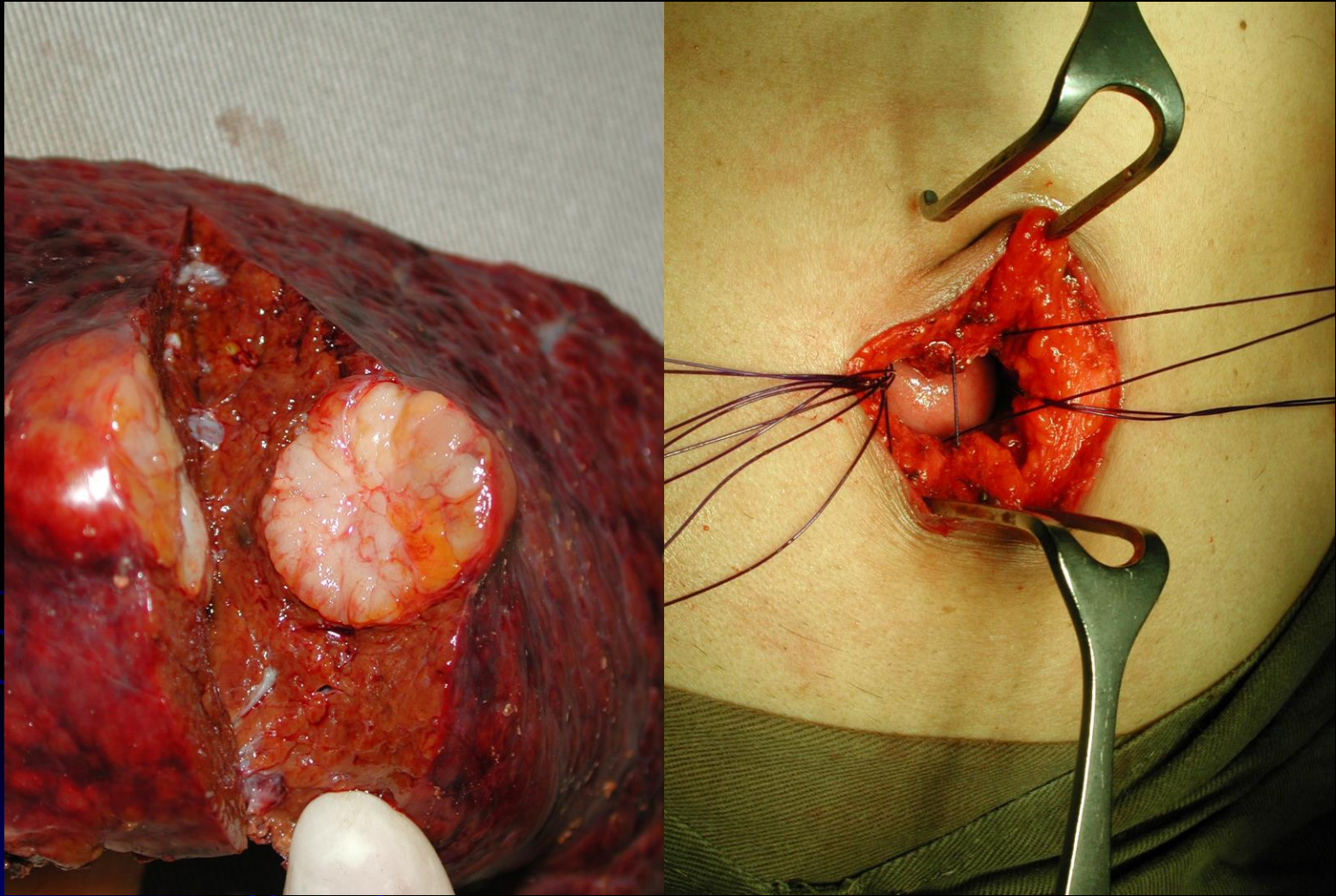
M/44, HBsAg carrier, 3cm lesion detected on screening USG, AFP normal



# 4-port technique without hand port







HCC Segment 2 and 3 specimen delivered from the extended umbilical wound





# Advantages of laparoscopic liver resection over open liver resection

## 腹腔鏡肝切除相對於剖腹肝切除的好處

- Jan 2003 – Dec 2006
- 25 patients underwent laparoscopic liver resection 腹腔鏡肝切除 were compared with 25 patients who underwent open hepatectomy 剖腹肝切除 in a pair-matched design
- ↓ blood loss, ↓ hospital stay, ↓ requirement of analgesics 止痛藥, earlier return to oral diet 進食

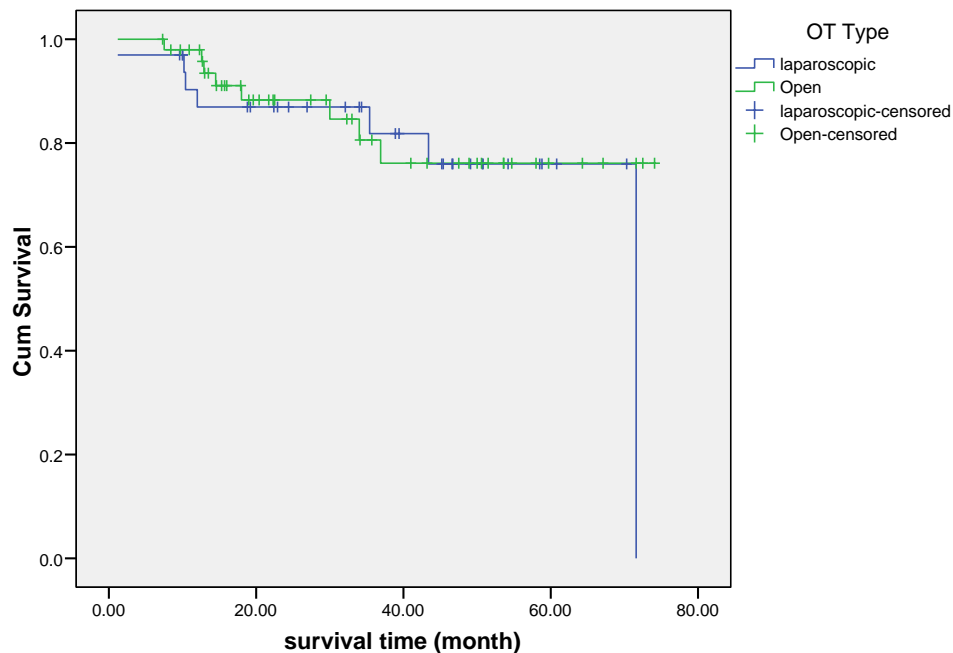
# Laparoscopic liver resection for liver cancer 腹腔鏡肝切除用於肝癌

- June 2004 - March 2010
- 33 patients underwent laparoscopic hepatectomy for liver cancer
- During the same period, 50 patients with liver cancer who underwent open liver resection were recruited matching with tumor size, site and type of resection for comparison

# Overall survival (Kaplan-Meier)

## 整體生存率

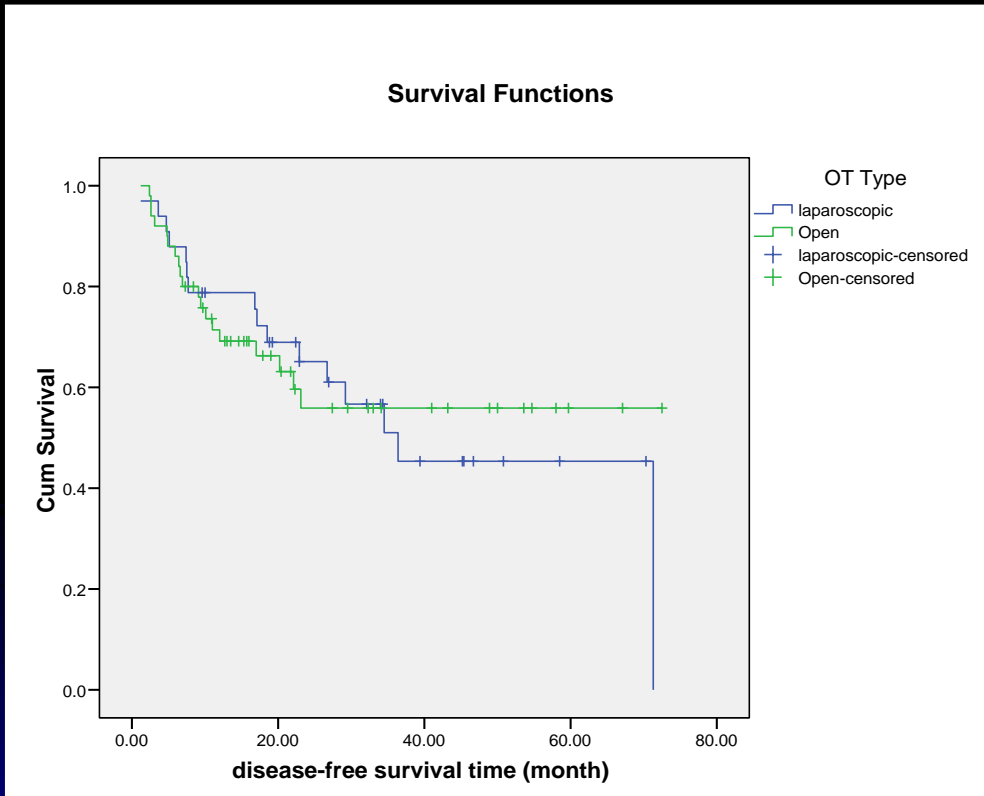
Survival Functions



	Survival Proportion	
	LH	OH
1 year survival	86.9%	98.0%
3 year survival	81.8%	80.6%
5 year survival	76.0%	76.1%

Log rank test: P-value = 0.646 (No significant difference)

# Disease free survival (Kaplan-Meier) 無病生存率



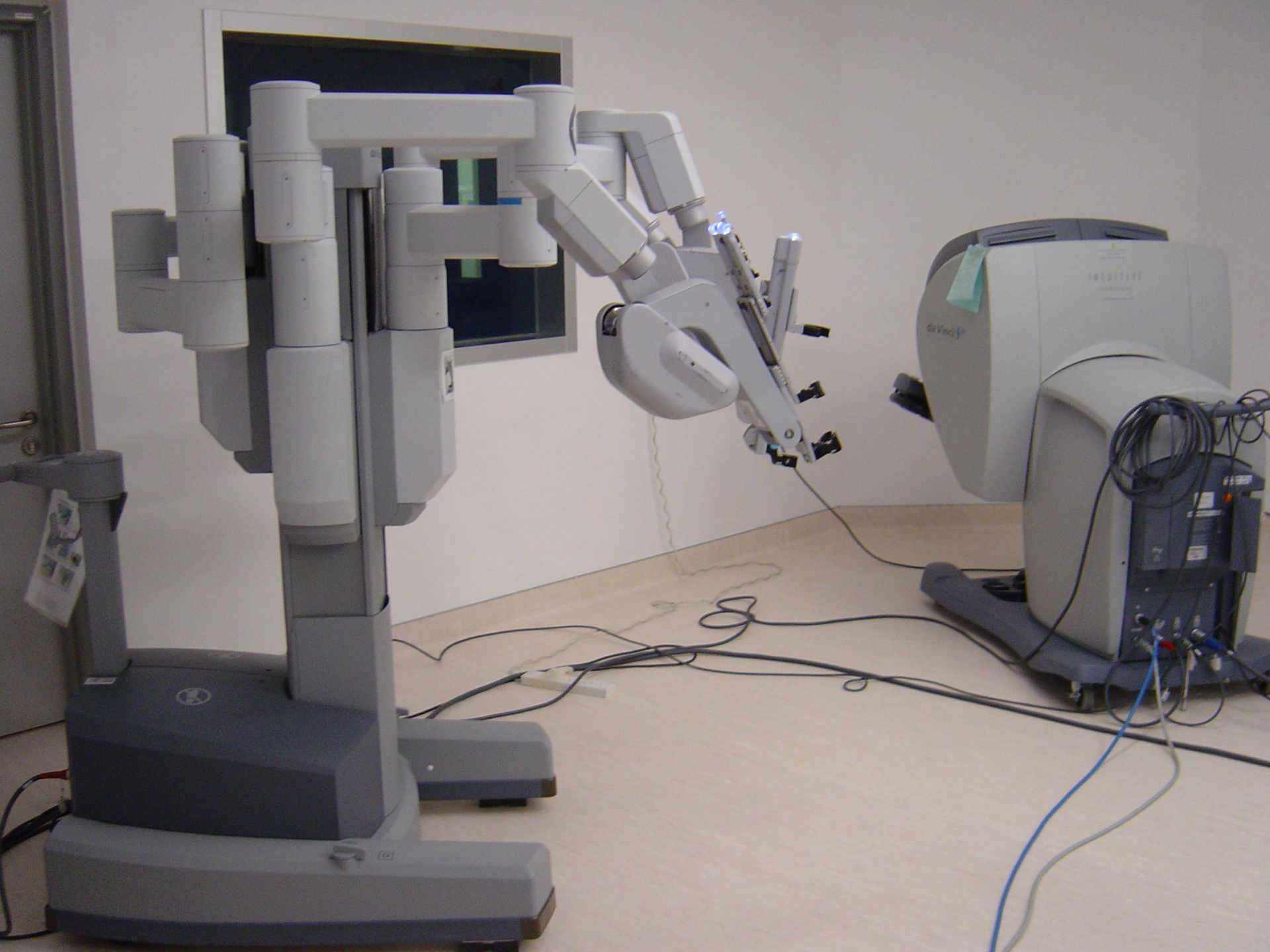
	Survival Proportion	
	LH	OH
1 year survival	78.8%	69.2%
3 year survival	51.0%	55.9%
5 year survival	45.3%	55.9%

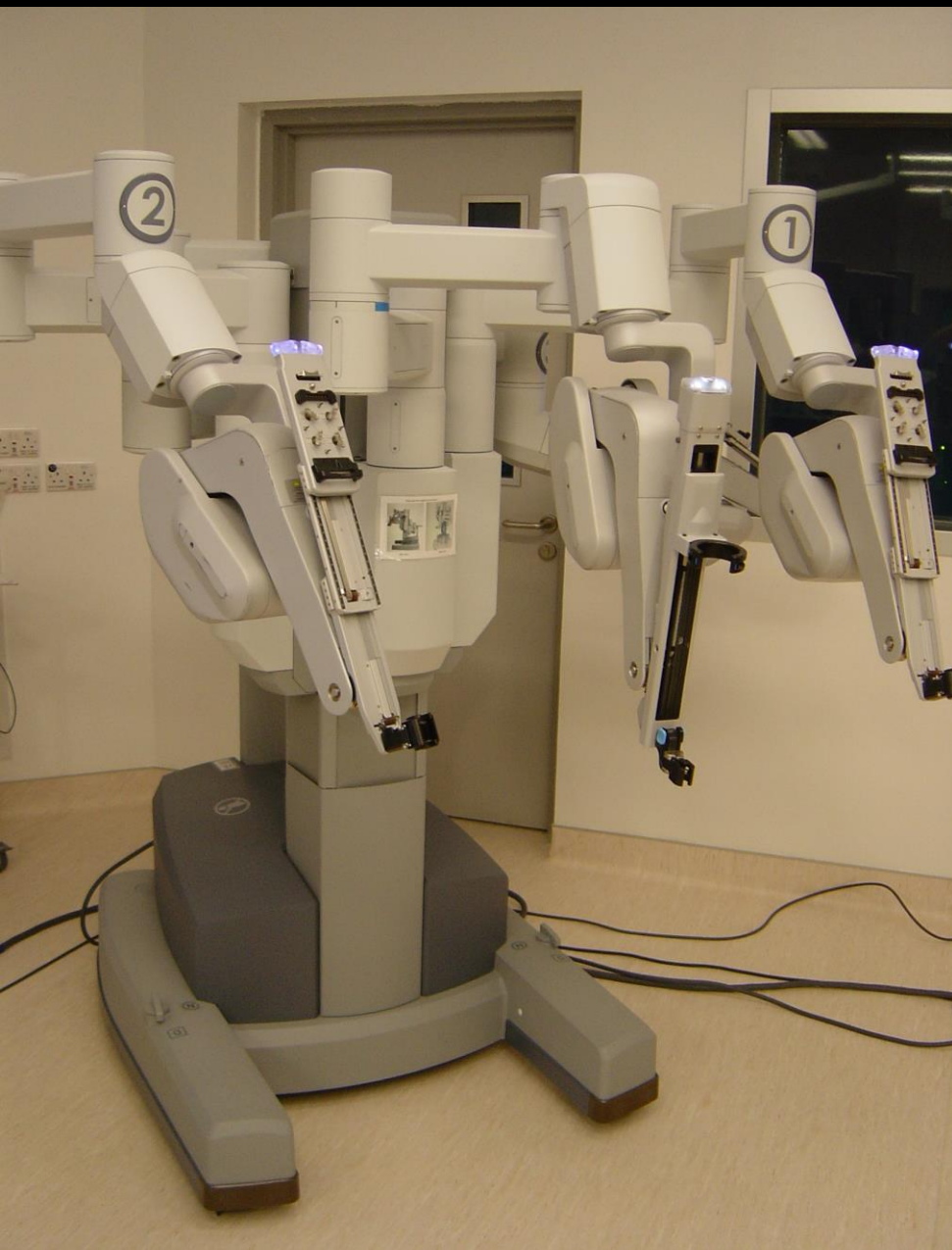
Log rank test: P-value = 0.849 (No significant difference)

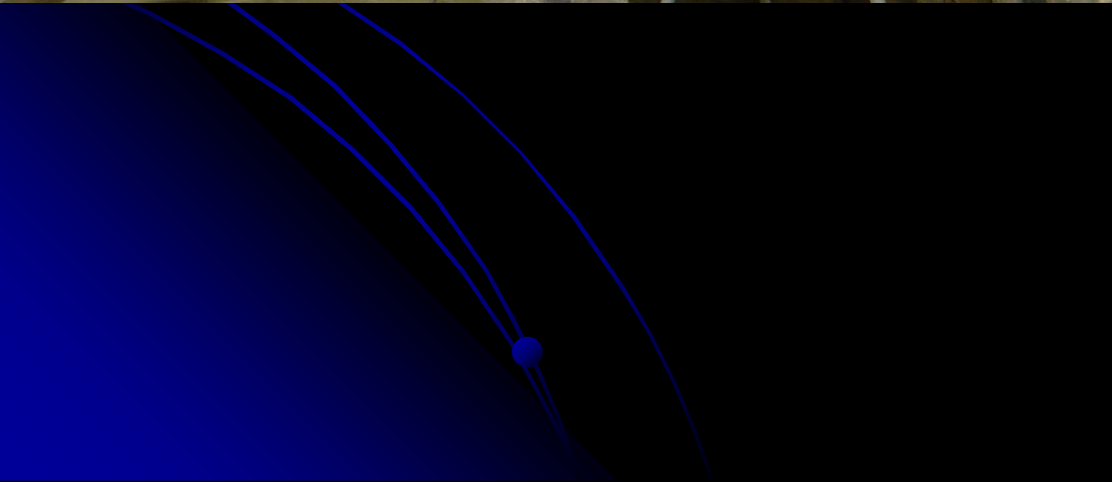
# Robotic liver resection

## 機械人肝臟切除

- Advantages of robot: 3 dimensional image with magnification, instruments with 7 degrees of freedom, better ergonomics人體功效學for operating surgeon
- Limitation and drawbacks: lack of tactile sense觸覺, narrow operative field, lack of appropriate instruments, time for docking and undocking of machine, cost









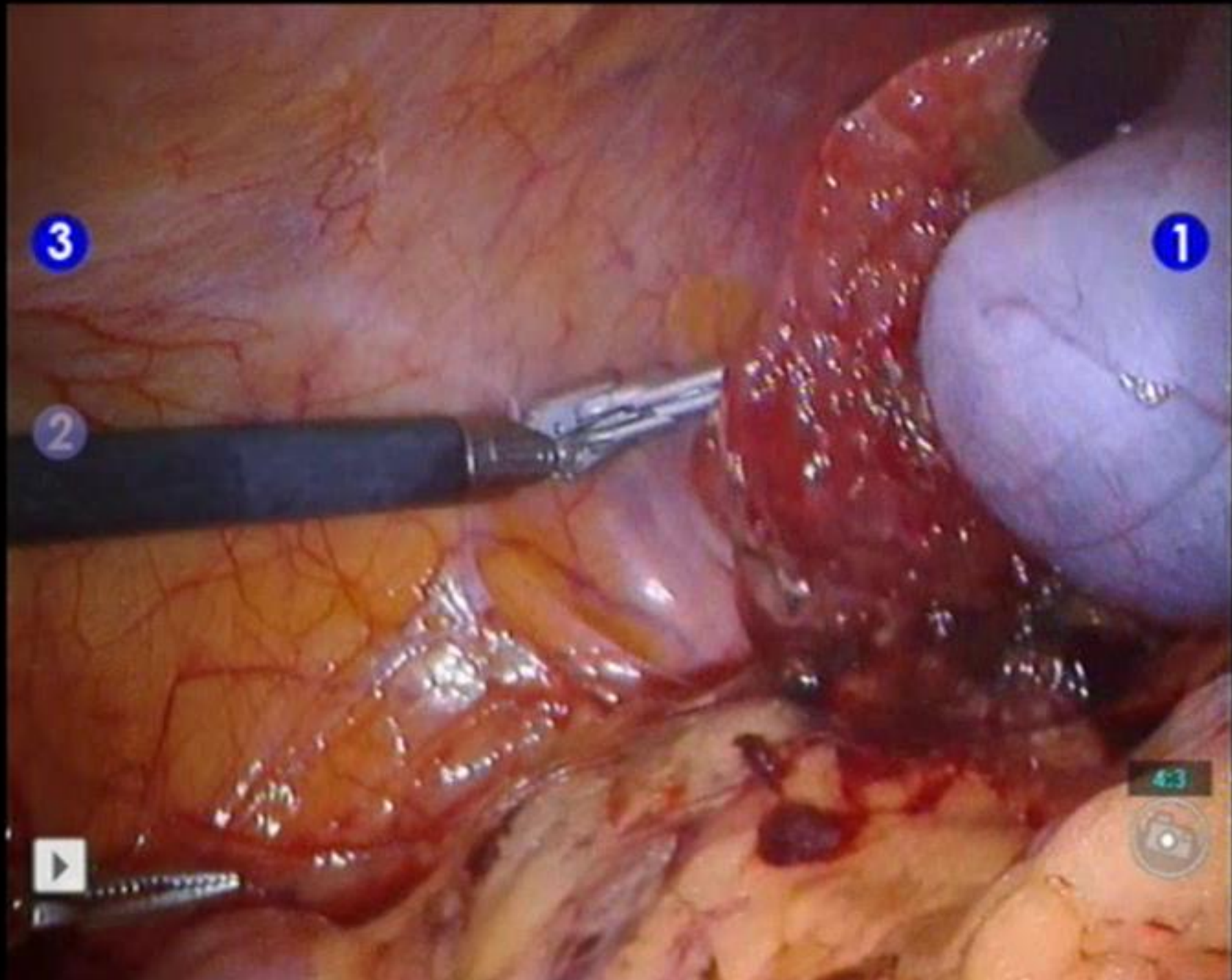


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# Result of robotic liver resection in world pioneer centre

- March 2002 – March 2009
- University of Illinois, Chicago, USA & Misericordia Hospital, Grosseto, Italy
- 70 robotic liver resections
- Conversion rate: 5.7%
- Mortality: 0%
- Morbidity: 21%
- Median blood loss: 150ml for minor resection and 300ml for major resection

# Local ablation of tumors

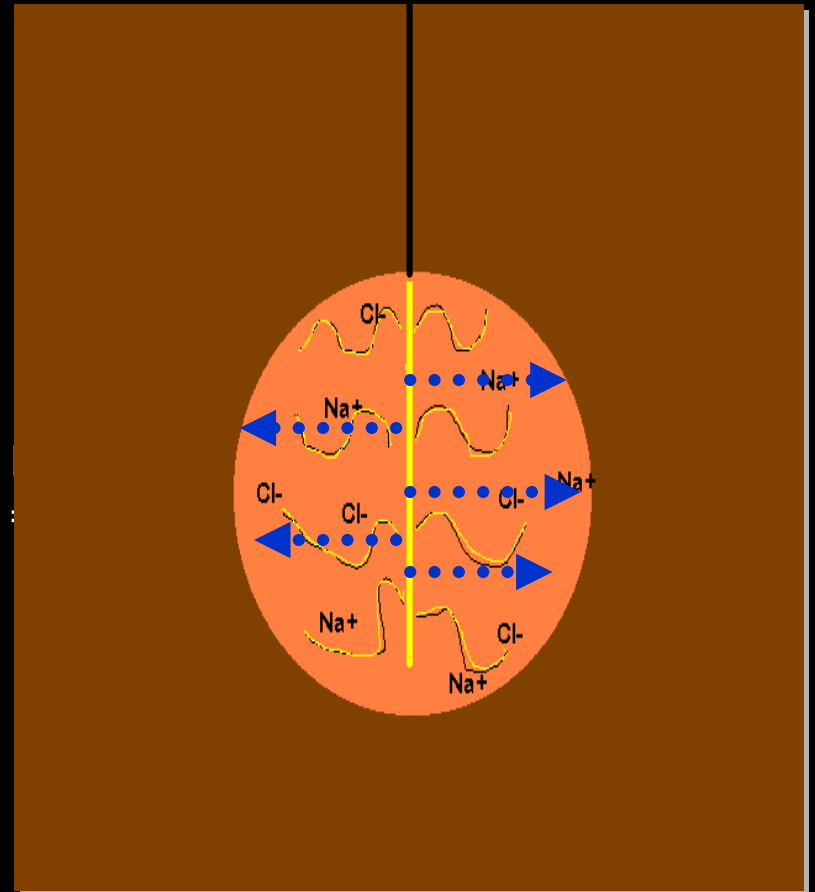
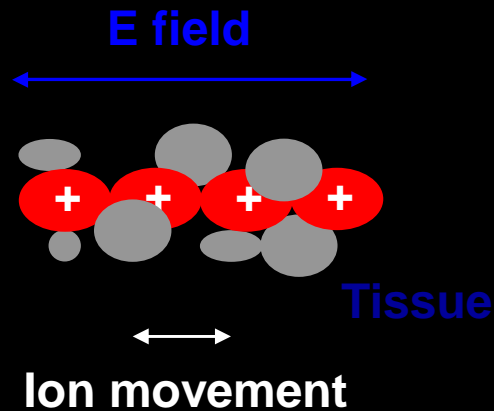
## 腫瘤局部消融術

Introduction of agent into liver tumor to cause death of tumor

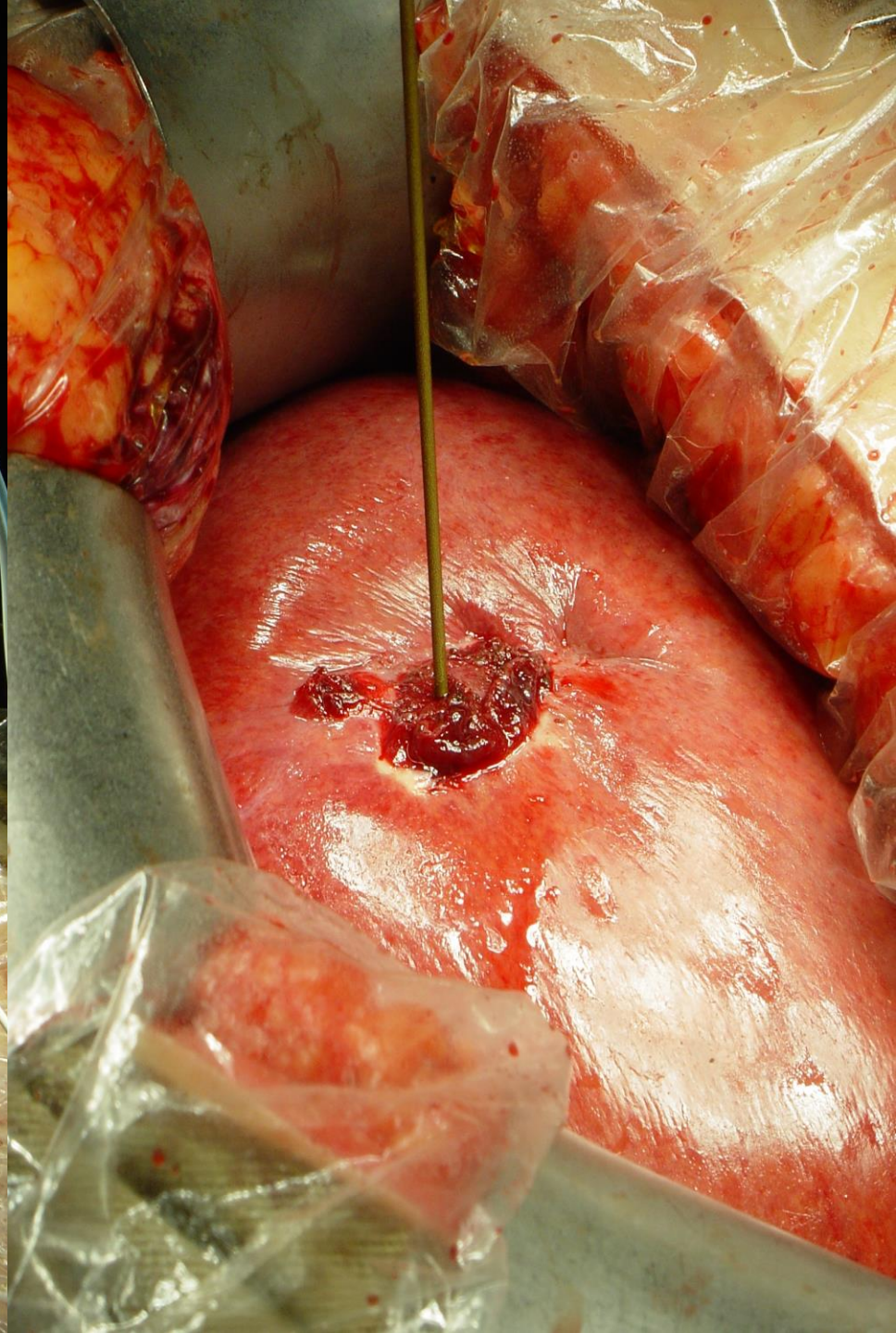
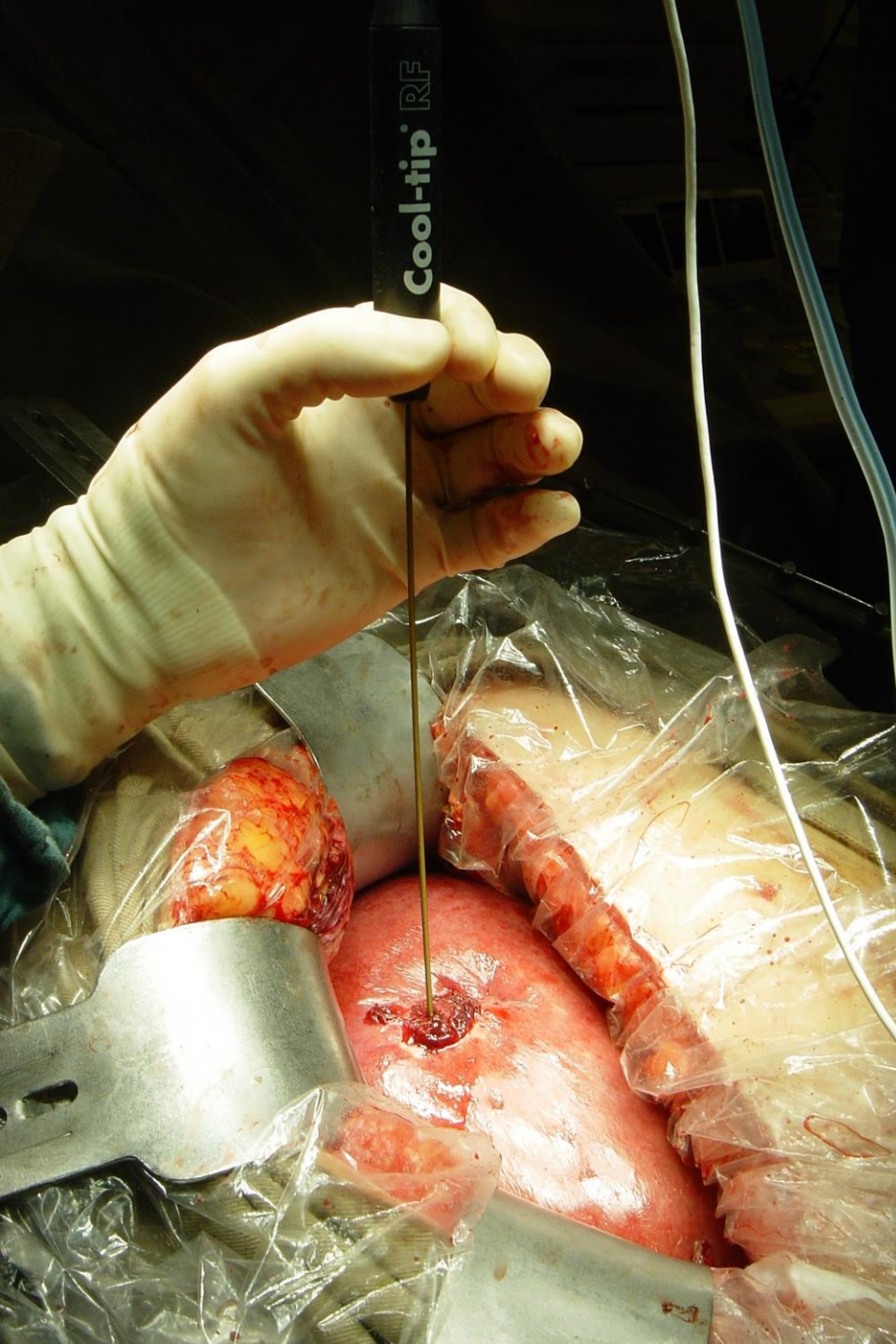
- Absolute alcohol (PEI) 無水酒精
- Laser 激光
- Cryotherapy 冷凍治療
- High intensity focus ultrasound (HIFU) 高強度聚焦超聲波
- Radiofrequency ablation (RFA) 射頻消融
- Microwave ablation (MVA) 微波消融

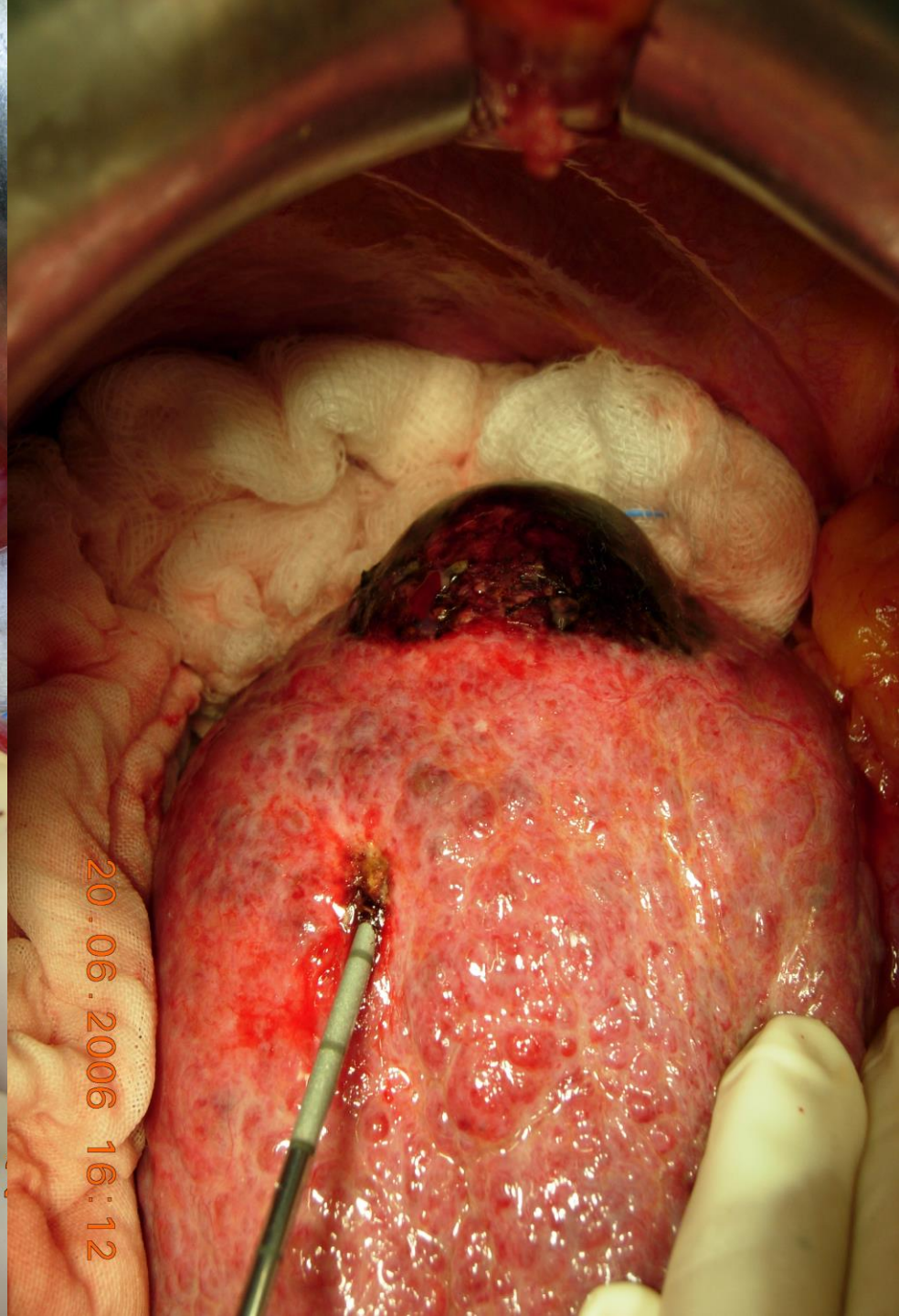
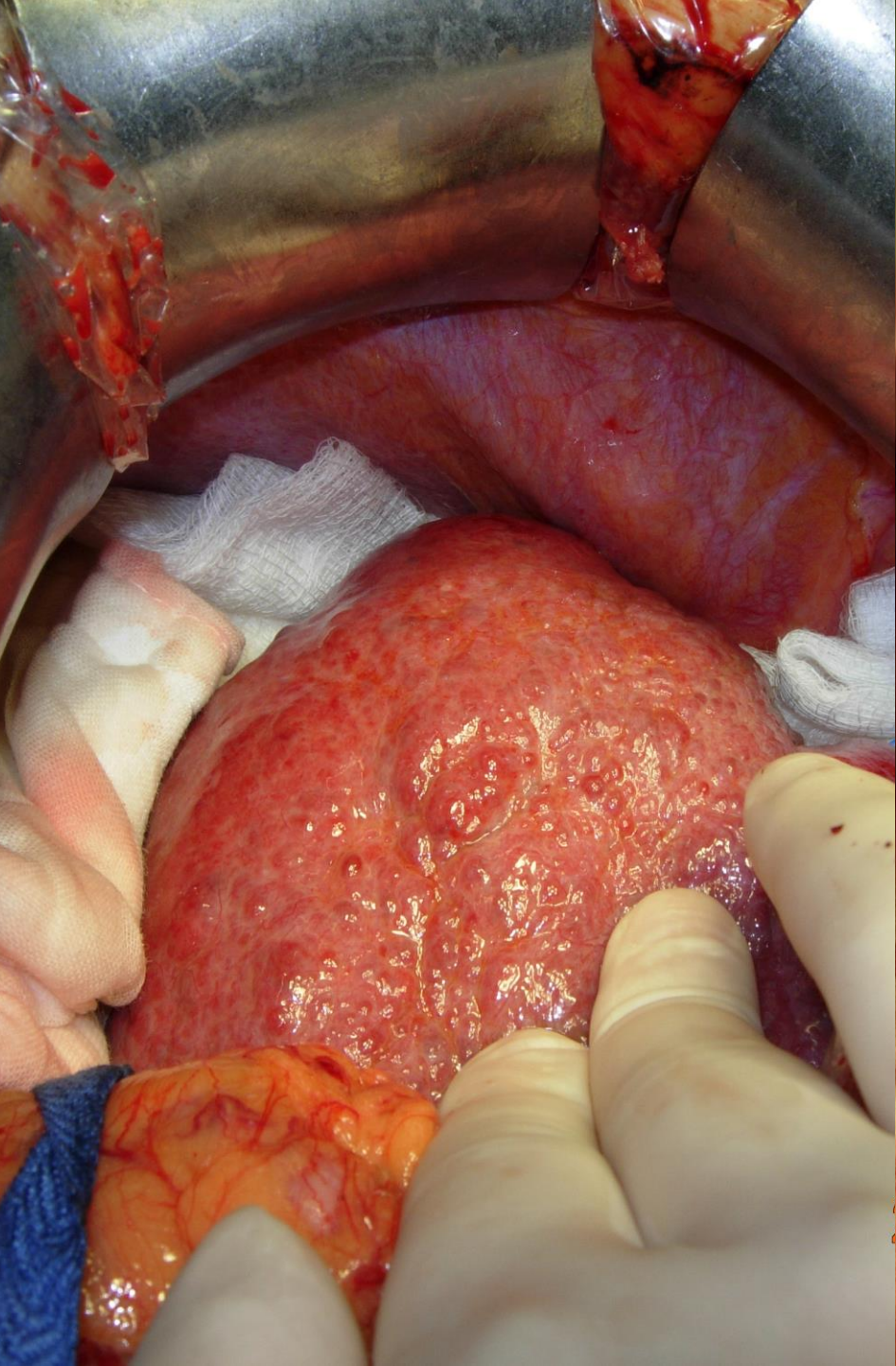
# RF Heating Mechanism 射頻消融

- Uses radiowaves at ~ 480 kHz.
- Heating mechanism: ionic agitation.



- Efficiency limited by tissue conductivity.
- Organs differ greatly in conductivity at RF frequencies.





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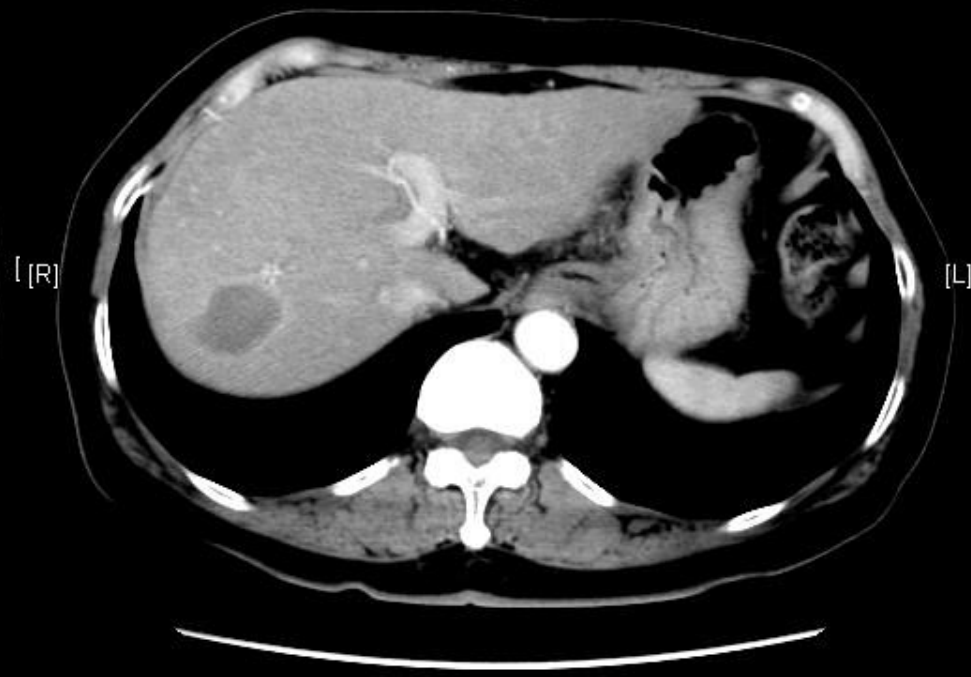
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MR



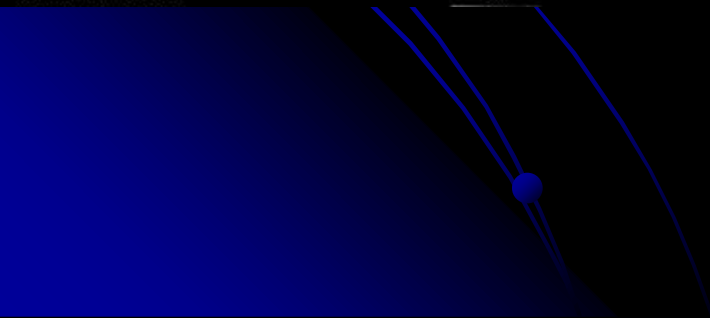
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VIS270 100ML

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C:  
W2I IOP 300 100ML

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C35  
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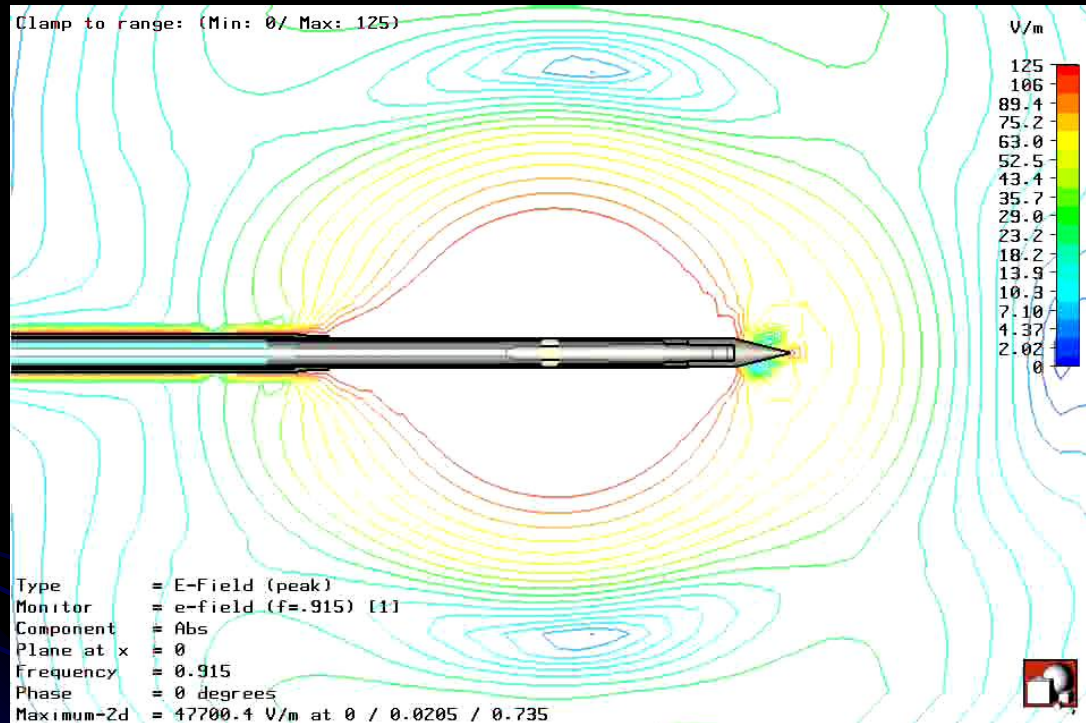


# Experience of RFA in PWH

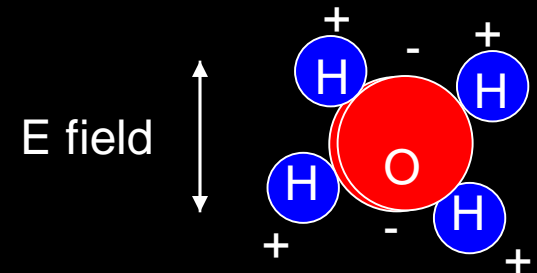
## 射頻消融

- May 2003- Feb 2006
- 79 patients with 110 liver tumors underwent percutaneous 經皮 (46.8%), laparoscopic 腹腔鏡 (8.9%) or open 剖腹 (44.3%) RFA
- Median tumor size: 2.4cm (0.5-8)
- Mortality: 0%
- Morbidity: 6.3%
- Complete ablation 腫瘤完全消毀: 82.3%
- Intrahepatic recurrence 肝內腫瘤復發: 52.3% with a mean FU 16 months (range 2.1-38.5)

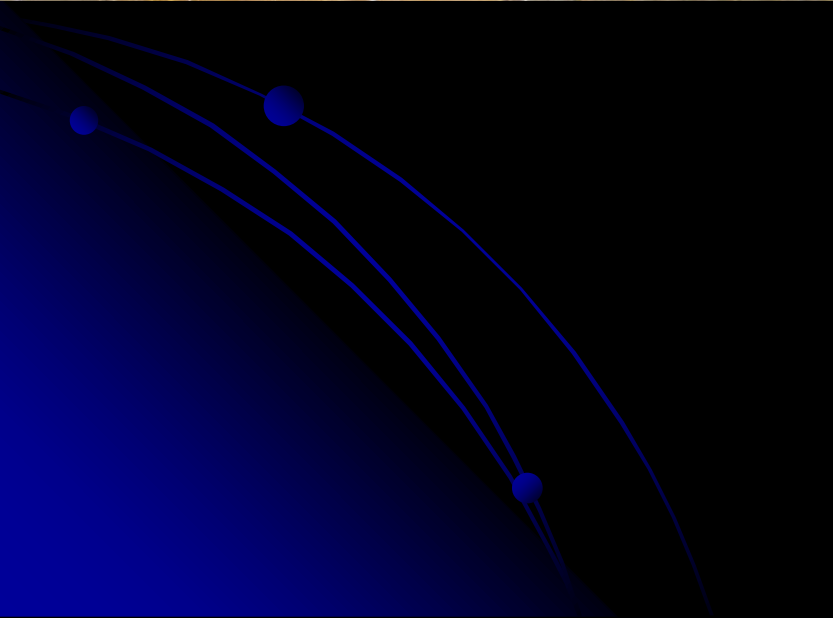
# MW Heating Mechanism 微波消融

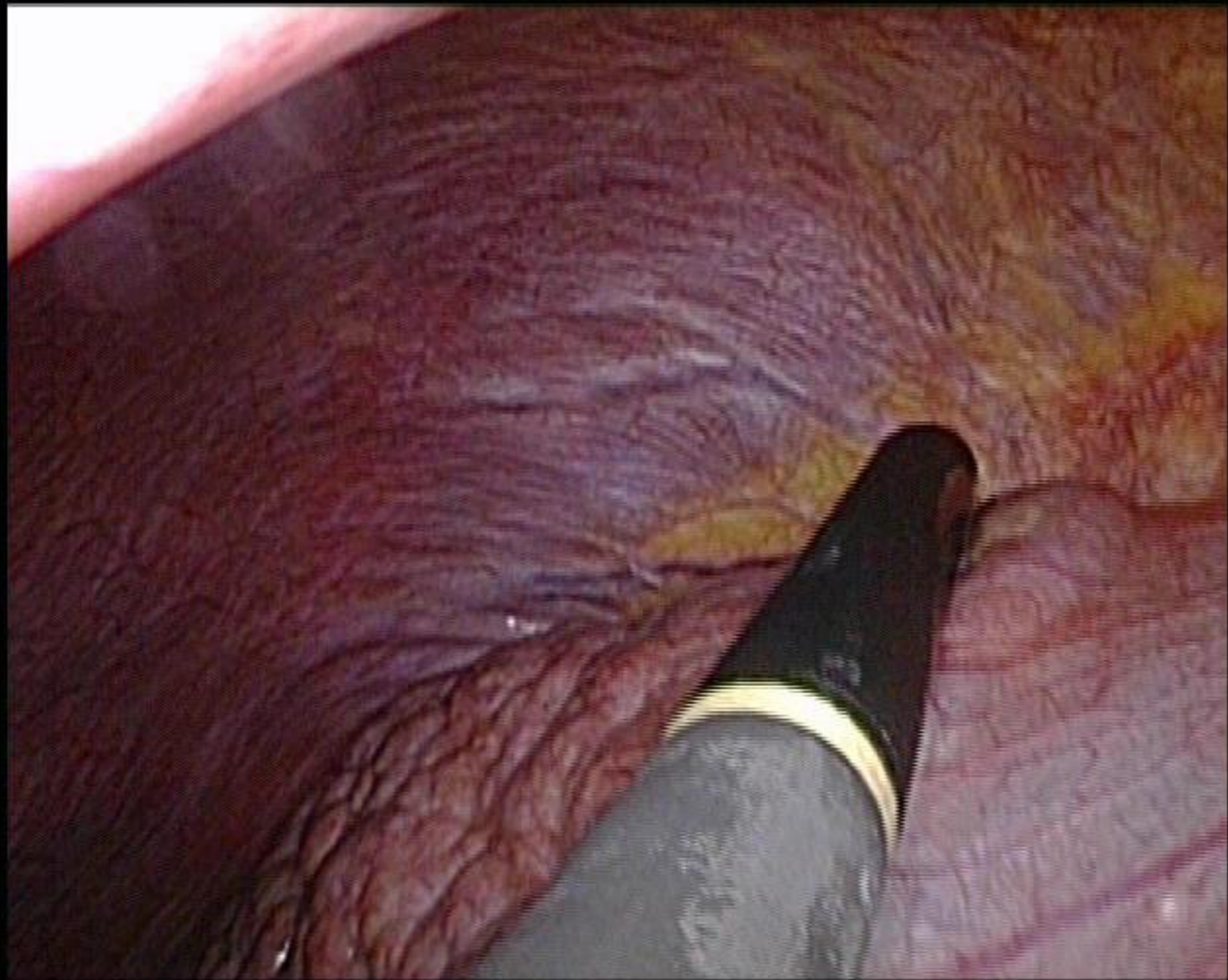


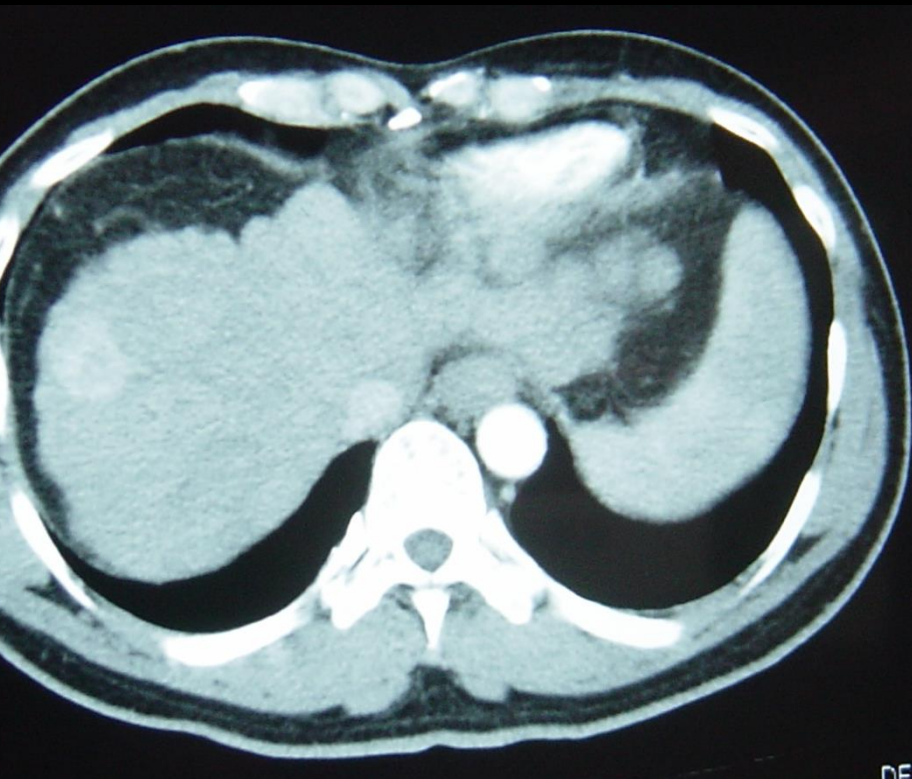
Heating mechanism:  
coupling to water dipole.



- Effective and consistent heating in all soft tissue organs.
- Faster, bigger, more repeatable ablations than RF.



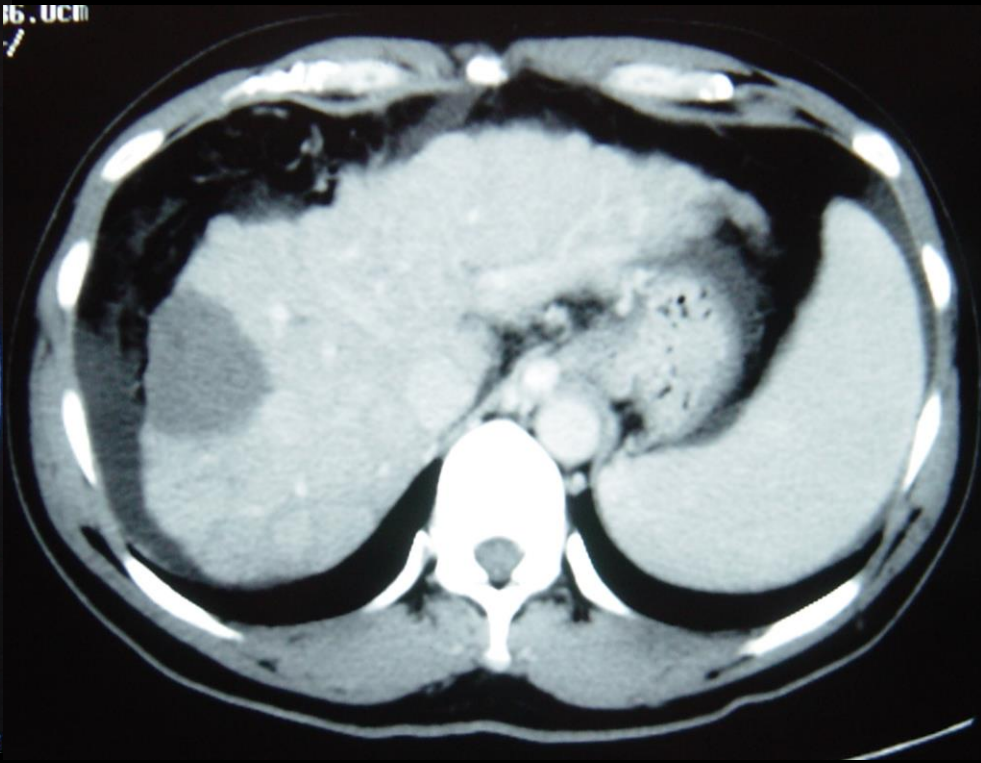




15. UCM

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# Experience of MWA in PWH

## 微波消融

- March 2009 - October 2010
- 24 patients with liver cancer received either laparoscopic腹腔鏡(N=15) or open剖腹MWA (N=9)
- Median tumor size: 3.5cm (0.6-6cm)
- Mortality: 0%
- Morbidity: 16.7%
- Complete ablation腫瘤完全消毀: 98.5%
- Intrahepatic recurrence肝內腫瘤復發: 20.8% with a median FU of 7.1 months (1-19.1 months)



# Conclusion 結論

- Like other surgical fields, liver surgery evolves rapidly
- Liver resection is much safer than previously
- Liver resection is moving towards minimal invasive 微創 and technology based (robot 機械人)
- Treatment options other than resection like local ablation 局部消融術 for liver tumors are coming up



Thank You