IMET 2000 PAL

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Iatrogenic lesions of the choledochus: if you know them...you avoid them!" The Problem ..!!!!

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Clinical scenario!!

A 45 years old male , presented abdominal pain, 21 days post cholecystectomy

A Ct Scan has confirmed the presence of an intrabdominal collection

Questions ?

What is the most likely nature of this collection?

What are the most frequent signs and symptoms of CBD injuries ?

Clinical presentation of bile duct injury

Global incidence

- Bile leak 41%
- Jaundice 32%
- Cholangitis 21%
- Sepsis 2%
- Abdominal pain 2%
- Secondary biliary cirrhosis and consequent complications 2%

Sandberg, Ann Surg 1985, Lillemoe, Ann Surg 199, Sicklick, Ann.Surg 2005.

Bile Leak

The incidence of bile leak ranges between 1.3% to 2.7%
(wolf, Arch Surg 1991, walkers, semin ultra CT MR 1993)

May arise from:

- Cystic duct
- Subvesical duct (duct of Luschka)
- Bile duct

Can present as:

- Intra-abdominal collection
- Biliary fistula
- Biliary peritonitis

: è eccezionale una raccolta di bile a così lunga distanza di tempo dall'intervento

We may presume that such a complication 21 days after surgery is uncommon !!

Do you agree??

Frequency

When is the most frequent period for bile duct injury manifestation?

Time of presentation

- Intra-operative recognition varies between 0-47%
  (Davidoff Ann.Surg 1992, Lillemoe Ann.Surg 1997, Connor etel, Br J Surg 2006)
- 60 % of injuries are recognized during the 1st week.
- Median delay in diagnosis is between 1 and 2 weeks (Carroll et el, Surg Endosc1998, Keulemans et el, Jam Coll Surg,1998)
- In a series of 6 patients, 3 patients presented with biliary sticture, at 3 weeks,6 months and 18 months (Moossa, Ann. Surg 1992)

Recognition of Bile duct injury

In **56591** LC, 235 BDI's were reported (0.42%). Nuzzo et al (Arch Surg 2005)

46% of BDIs were identified intra-operatively

- Bile leak 73%
- OTC 19,4%
- Double stump 7.4%)

54% post-operatively

- Biliary fistula/collection 44%.
- Bile peritonitism 38%.
- Jaundice 18%.

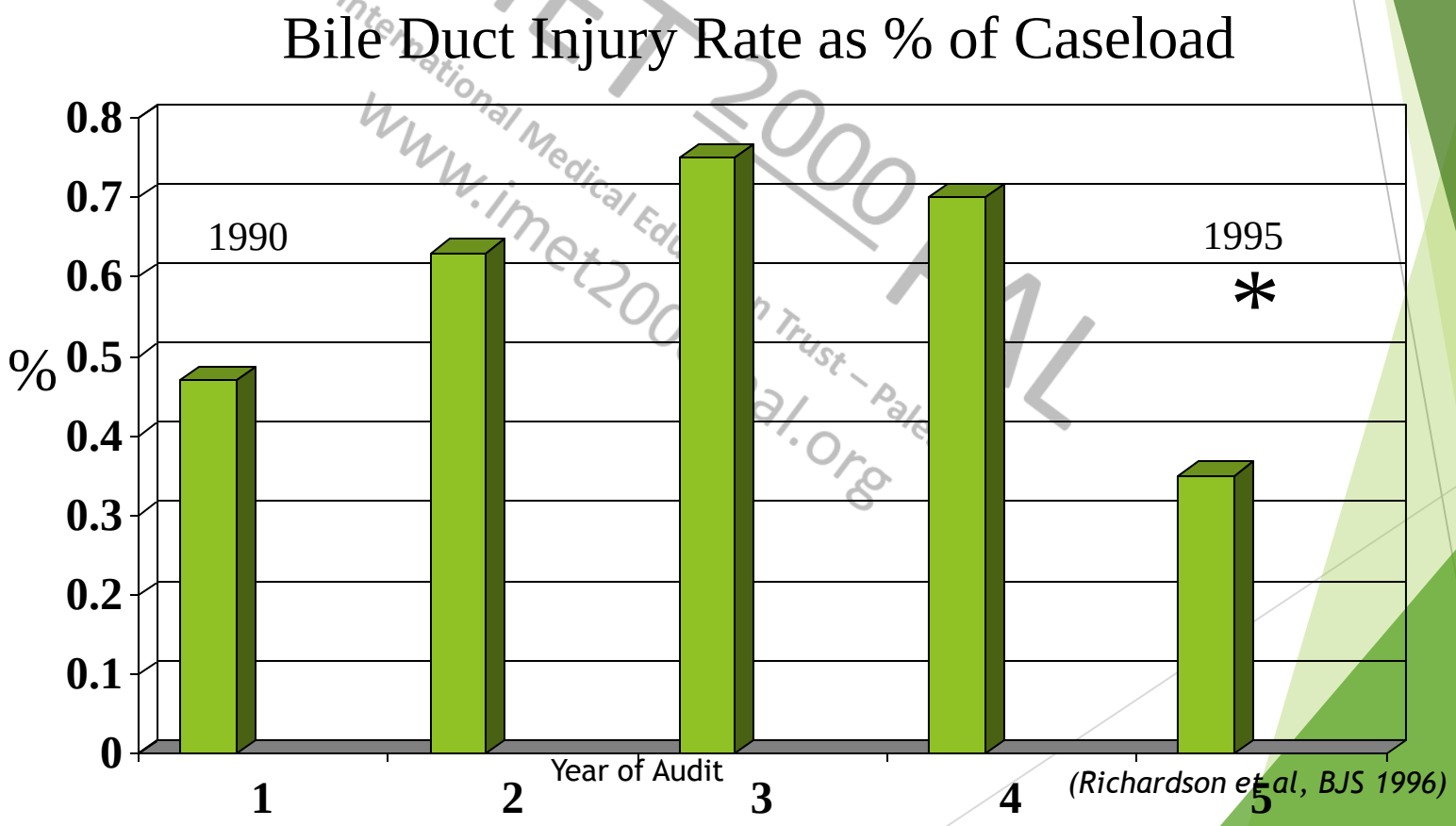
Table I. Delayed recognition of bile duct injury in LC

Author, year	*No. of injuries*	*Delayed recognition*
Woods et al, 1994[26]	81	50 (62%)
Stewart & Way, 1995[27]	85	65 (76%)
Olsen, 1997[19]	177	129 (73%)
Hugh, 2000[28]	34	27 (79%)

Recognition of the injury was classified as delayed if the surgeon completed the cholecystectomy unaware that an injury had occurred.

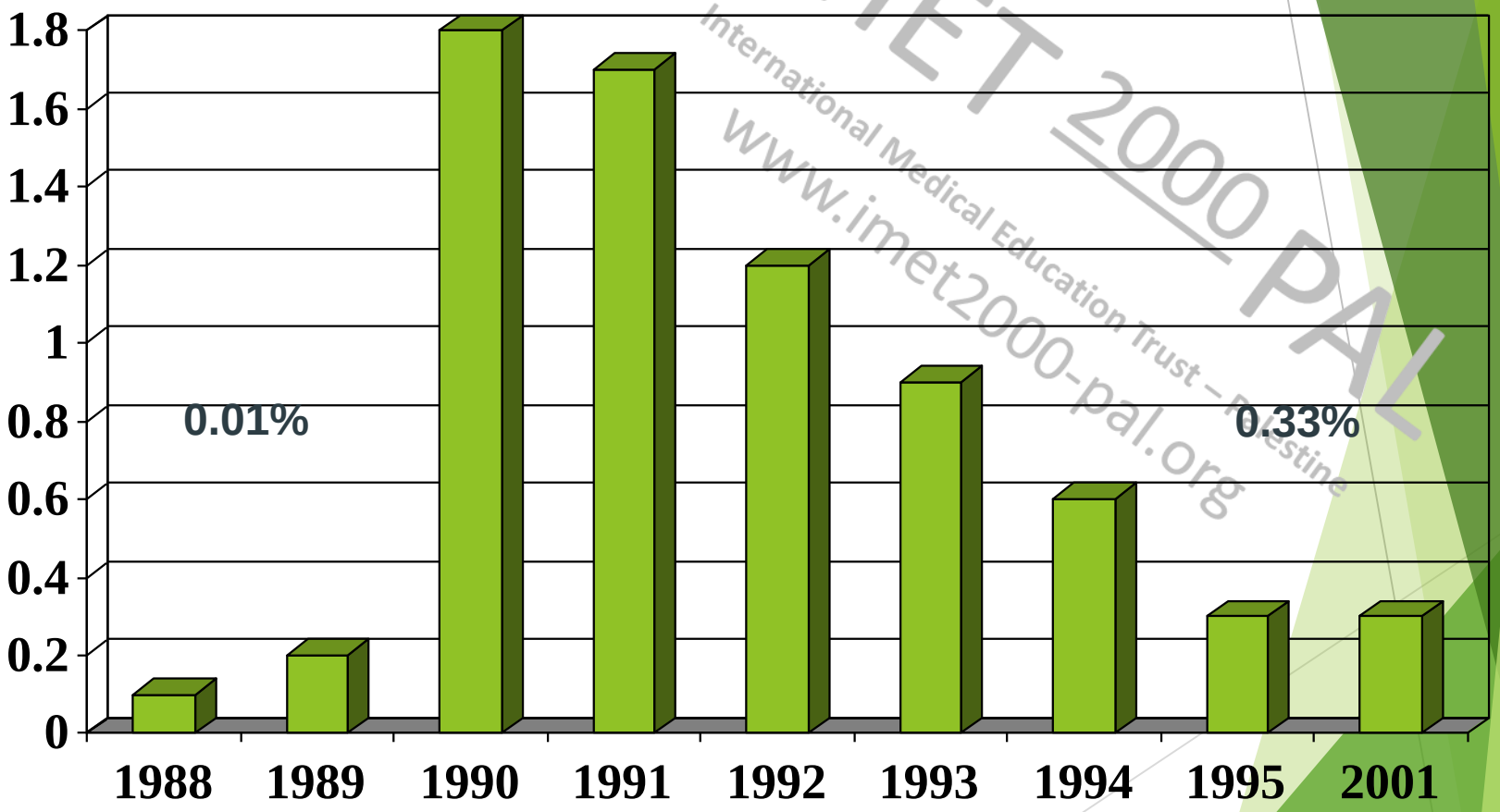
Is it true that the Global incidence of bile duct injury is reducing ?

Bile Duct Injury: The West of Scotland Audit of 5913 Cases



(Richardson et al, BJS 1996)

Bile Duct Injury Rate (% of cases in the World Literature) 1988-2001



Incidence of Bile duct injury

- In the largest National Italian study, rate of CBDI was 0.42% !!!!!. *(Nuzzo et el, Arch Surg 2005)*
- In a large Swedish review, incidence of CBDI dropped to 0.33% in 1994, then restarted to increase to levels of 0.47% in 1999 then levelled till 2002 !!!!!!. (Waage et el, Arch Surg 2006)

The use of clips has reduced cyst duct leak !!

Is this true?

What are the common mechanisism..... of injury? And in what frequency?

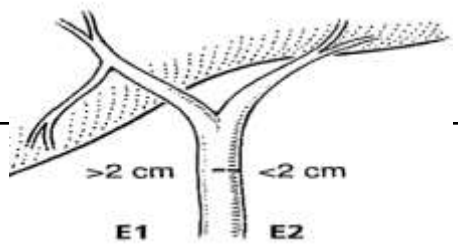
Classification of BDI

- Bile duct Laceration
  - (minor <25mm, major >25mm, at CD-CBD junction)
- Bile duct transection
  - (complete, incomplete)
- Bile duct excision
- Bile duct stricture

MECCHANISMS of BDI

- Misidentification of CHD for CD in 66% of cases (Known as the classic Injury)
  Davidoff, Ann.Surg 2002
- Tenting injury: a portion of BD is clipped and removed
- RHD is misidentified as CD, clipped and divided
- Strictures due to bad use of diathermy or clips.
- Lacerations; diathermy, seizure, clips, clip applicators and traction
- CD stump leak due to misplaced or displaced clips.
- **THE INCIDENCE OF CYSTIC STUMP LEAK INCREASED USING CLIPS IN THE ERA OF LC WHEN COMPARED WITH LIGATION IN OPEN SURGERY.**

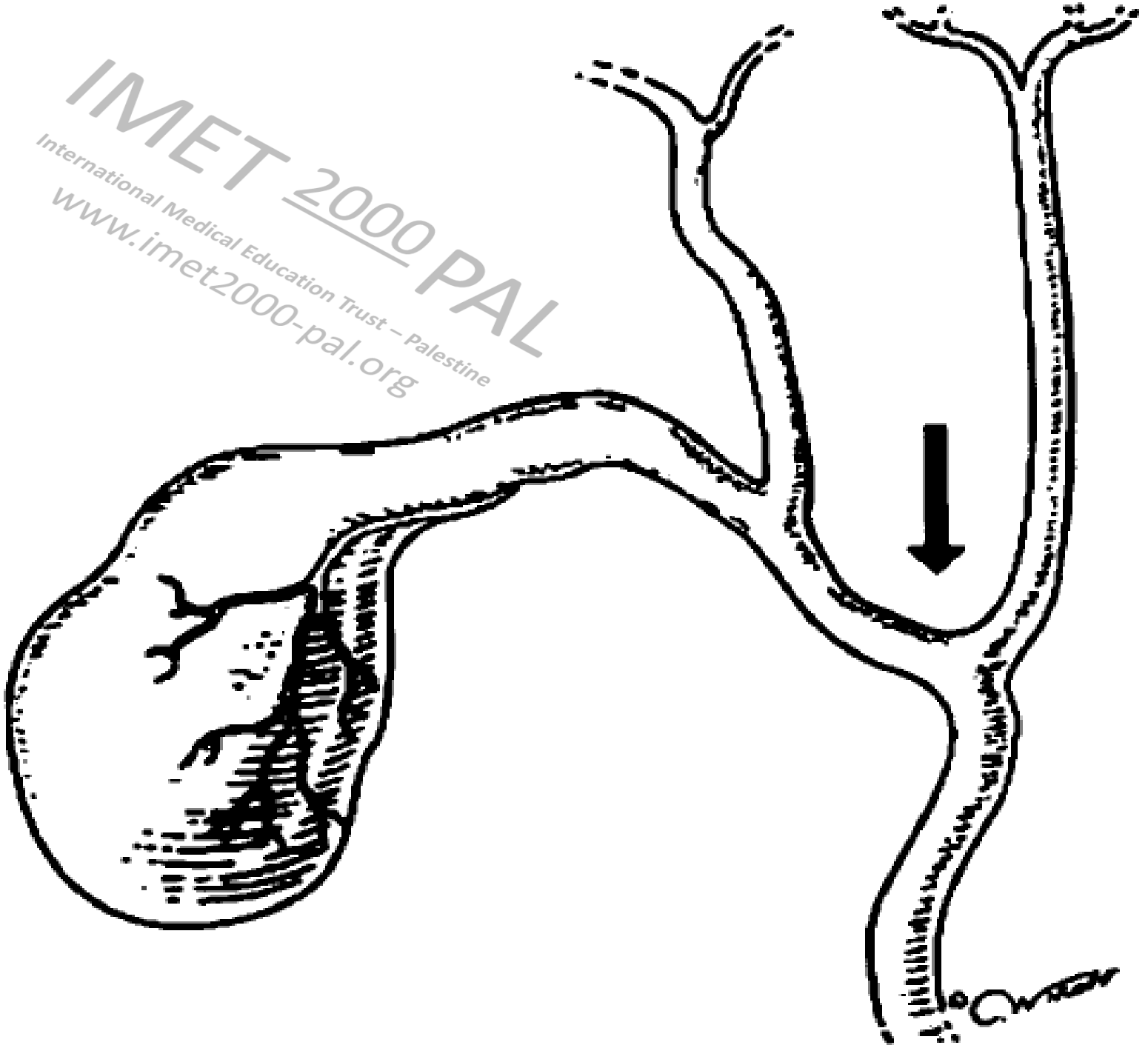
Where injuries are more likely to occur?

Type of Injury	Archer, Ann Surg 2001 mulitcenter	Lillmoe, Ann Surg 1997, tertiary centre	Carroll, Surg Endosc 1998, multi center	Alves, Ann. Surg 2003, Tertiary center
E1 	71%	13%	11%	41%
E2	Included with E1	39%	56%	Included with E1
E3	10%	28%	13%	28%
E4	1.8%	11%	13%	31%
E5	7.5%	5%		Included with E4
Others	10%	4%	7%	

Did Surgical training fail to prevent CBDI ?

Traditional maxims

- *No structure should be divided until it is clearly identified (??,??, ??)*
- *Adequate exposure of Hartmann's pouch and CD junction (neck!!, big/small???, low high ???)*
- *Operative cholangiography should be routine (prevention recognition ? False assurance ??)*



So what is the problem??

Is it result of imprecise dissection and poor visualization of anatomical structures ??

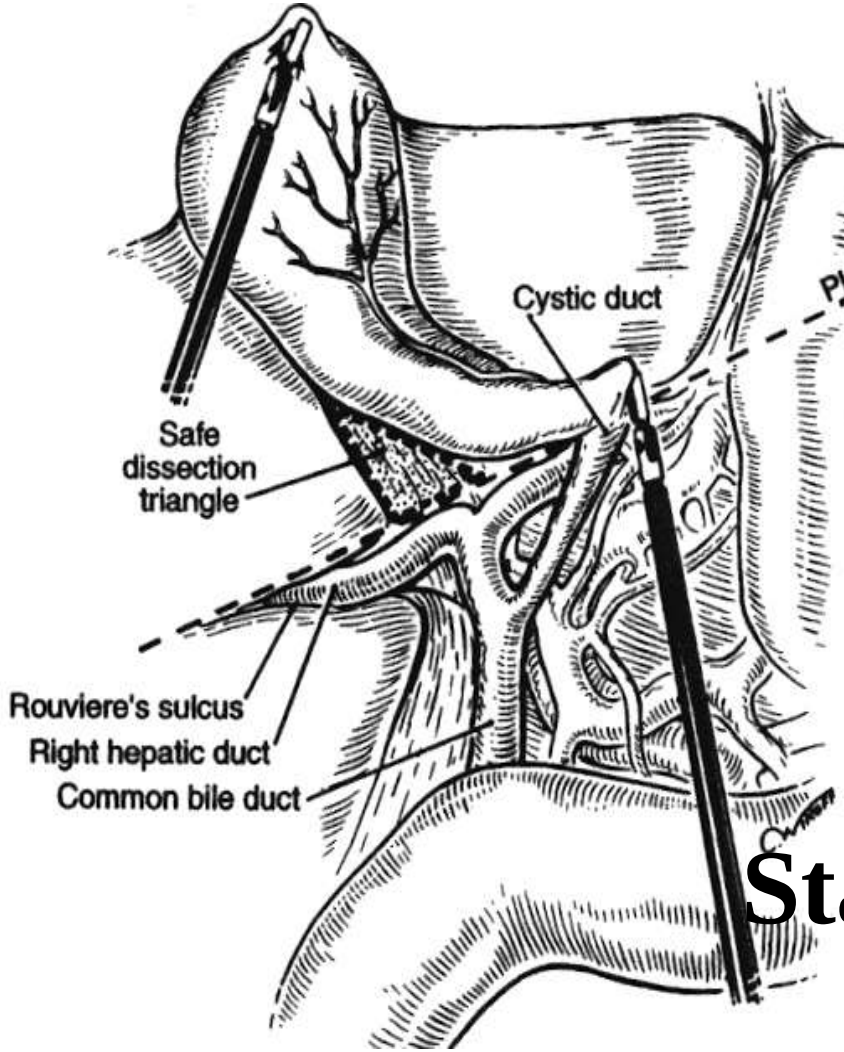
Is it "person approach" to error ??

Is the term the bad things happen to bad people Correct ?

Does continued experience BDI by trained surgeons, suggests that there may be "systemic" underlying causes related to deficiencies in training and attitudes ??

Rouvière's sulcus

and the safe dissection plane



Start from a fixed point

TB Hugh et al. Br J Surg 1997; 84: 1253-4

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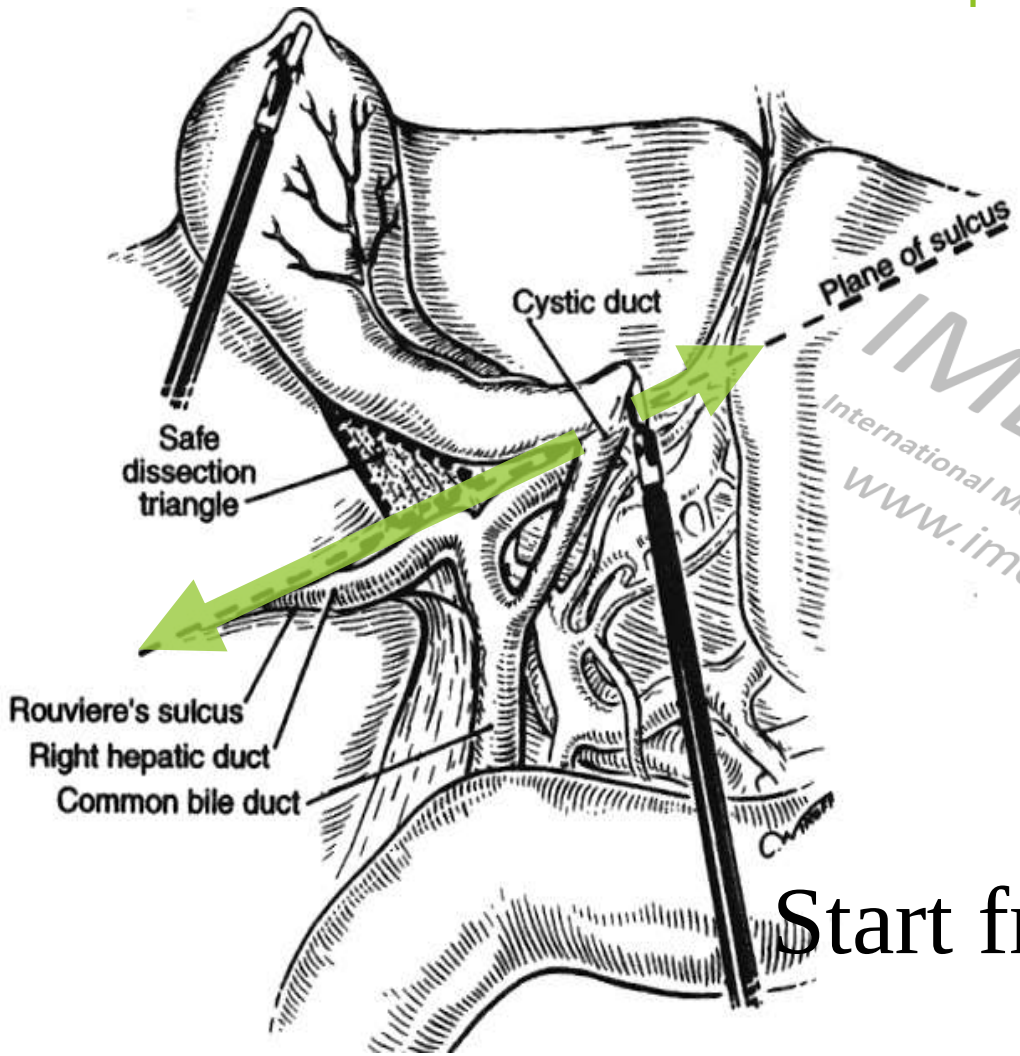

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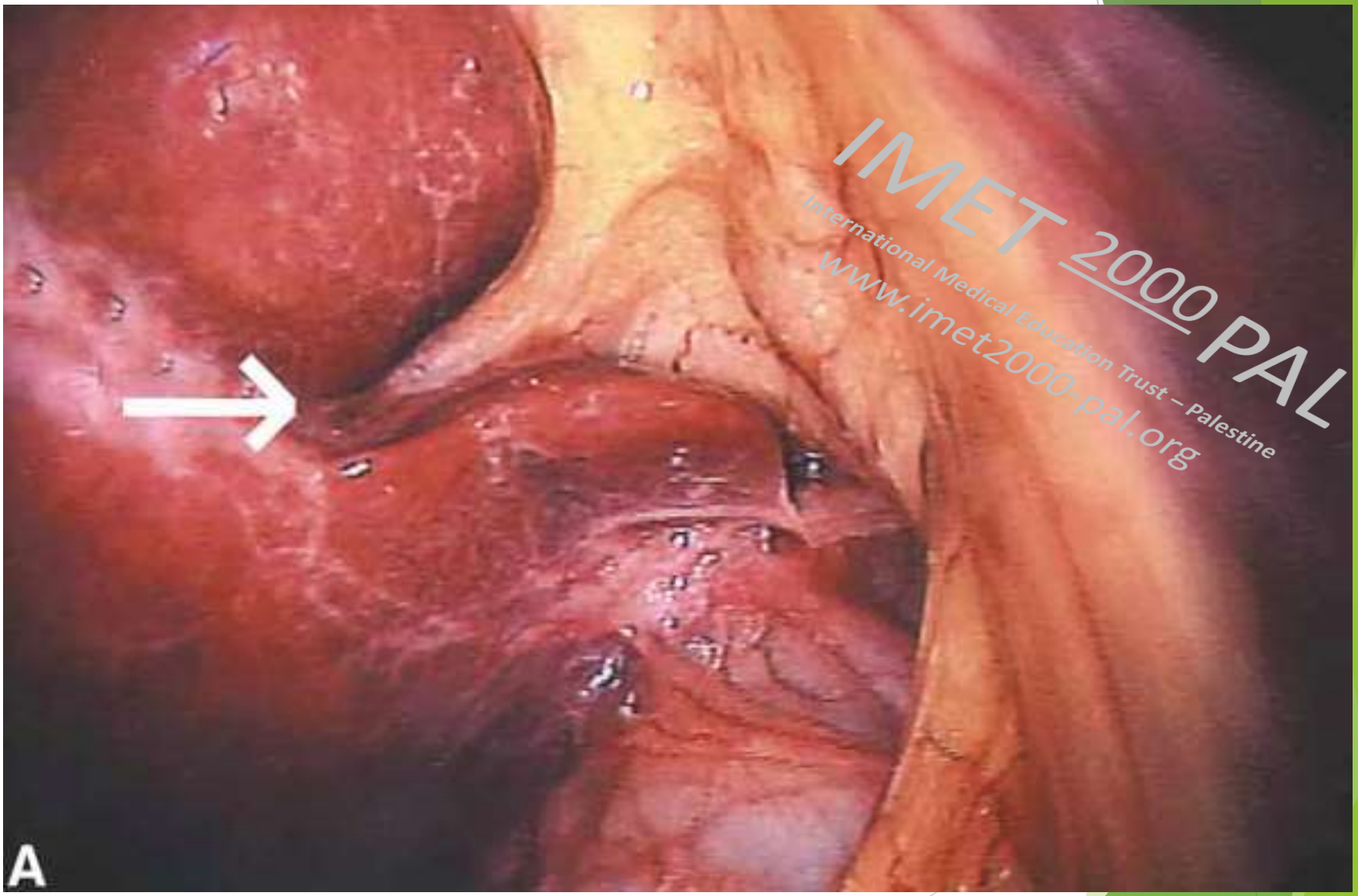
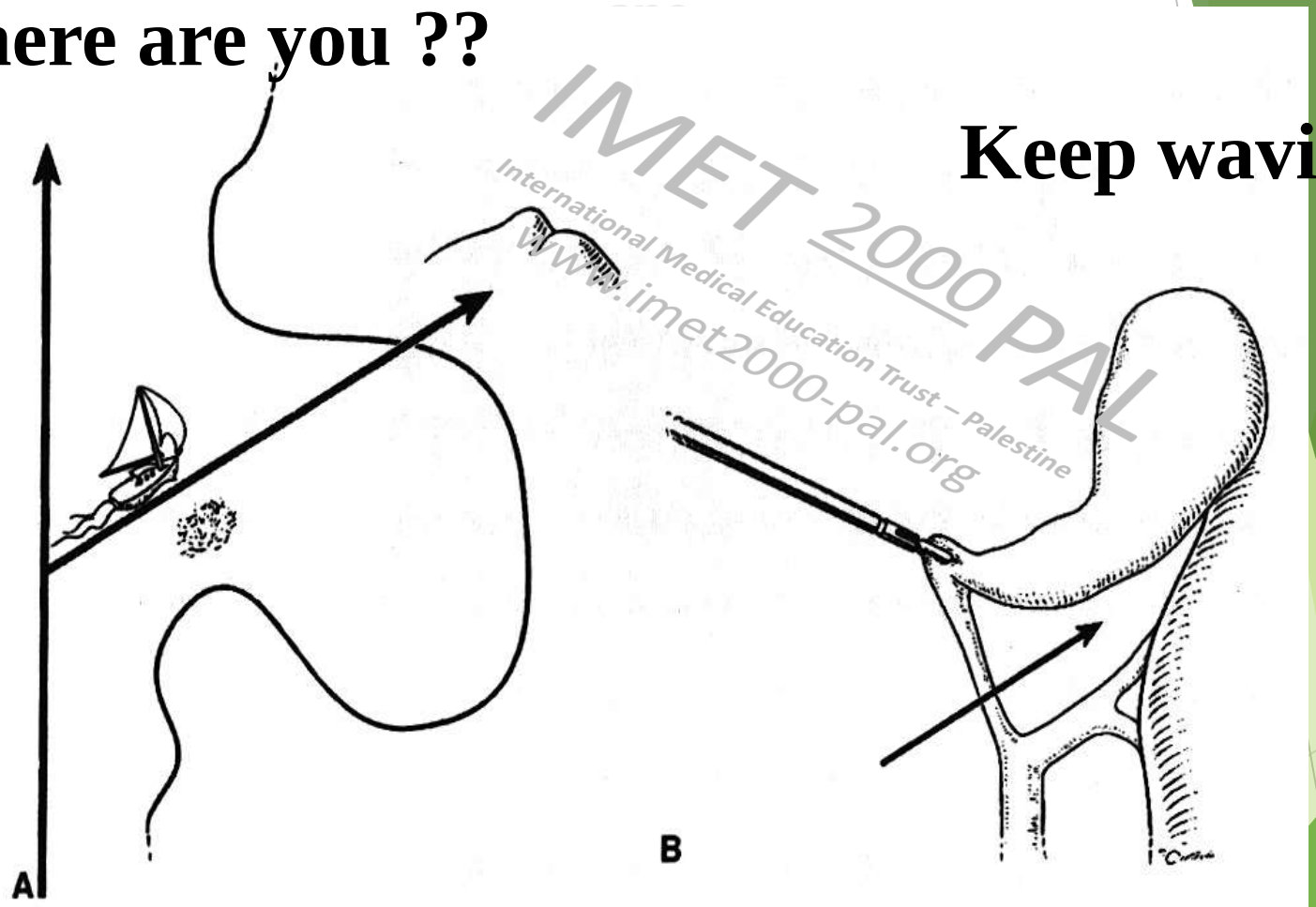


The clearing bearing principle

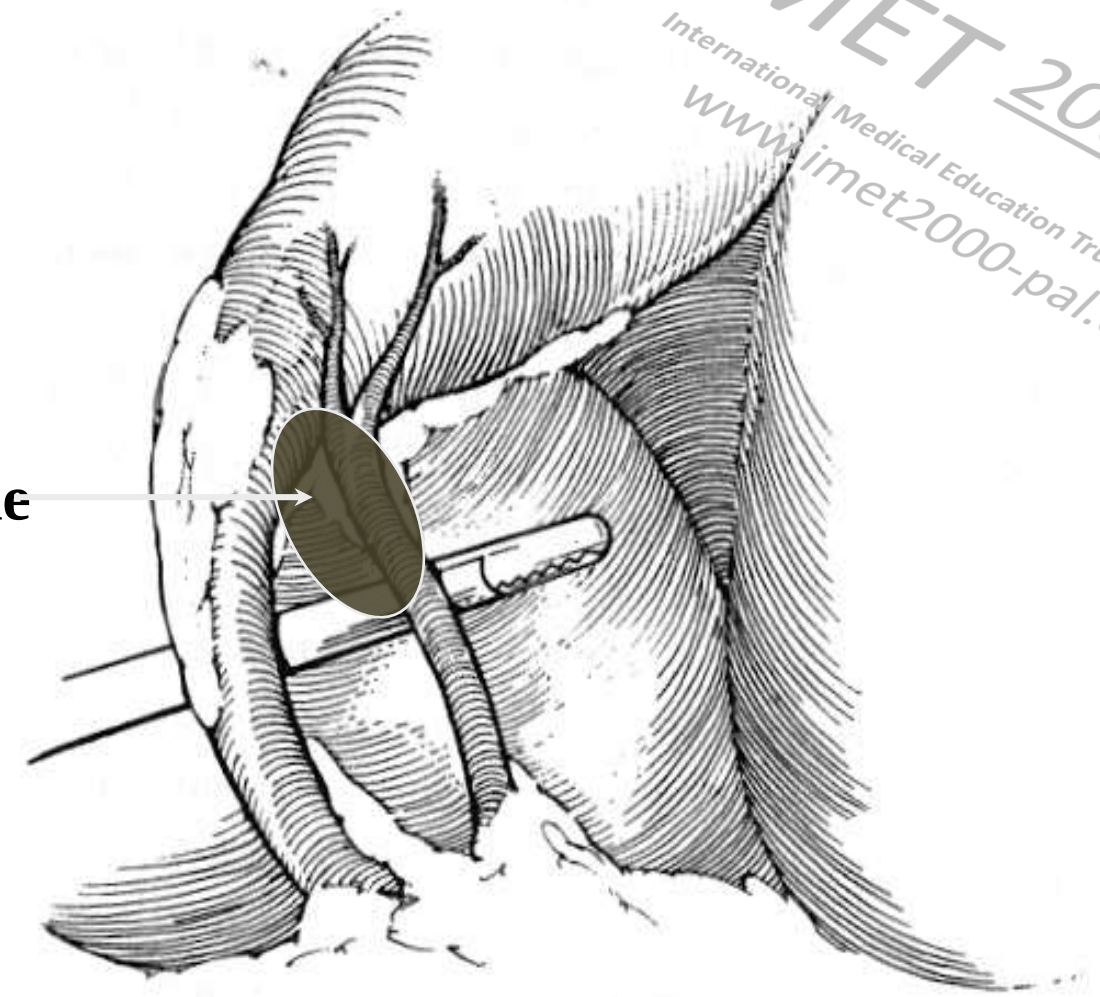
Where are you ??

Keep waving



Navigate away from submerged shoal !!

The critical view of safety

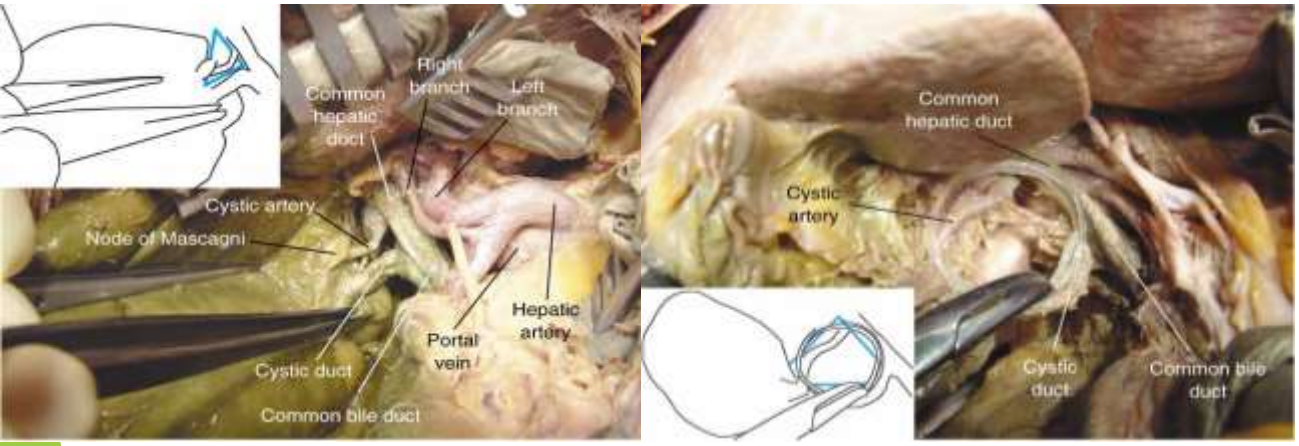


Strasberg et al. J Am Coll Surg 1995; 180: 101-25

Optimizing the critical view of safety in laparoscopic cholecystectomy by clipping and transecting the cystic artery before the cystic duct

surface area of Calot's triangle following dissection in ten embalmed human bodies

"critical view"	release of GB neck	division of cystic artery
2.6 cm^2	4.0 cm^2	6.2 cm^2

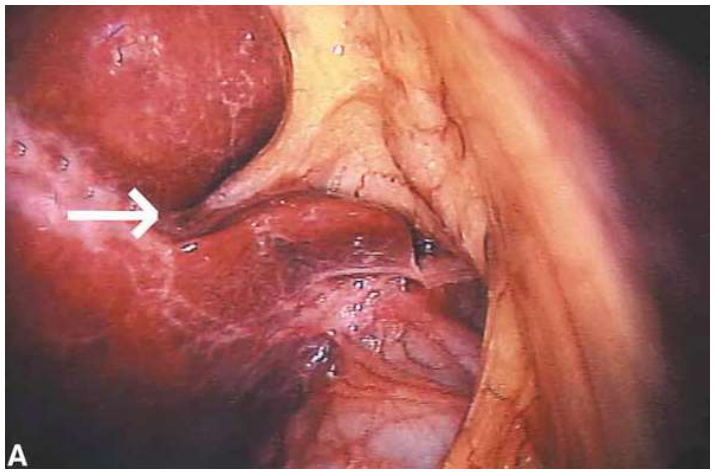


Wijsmuller et al. Br J Surg 2007; 94: 473-4

Human factors

Psychological factors in the production of error ?

LC



Highly trained professional

Complex tasks

Rapid decisions

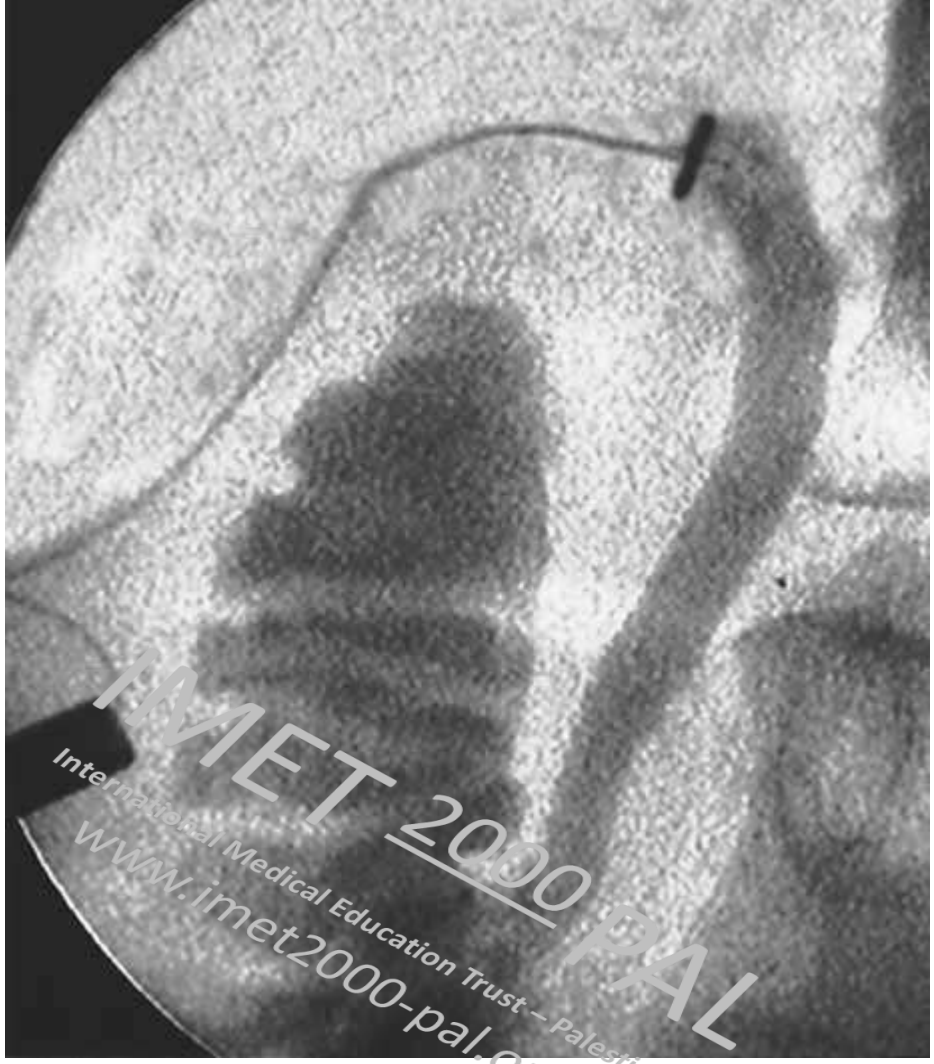
Conditions of uncertainty

Disastrous mistakes

aircraft cockpit

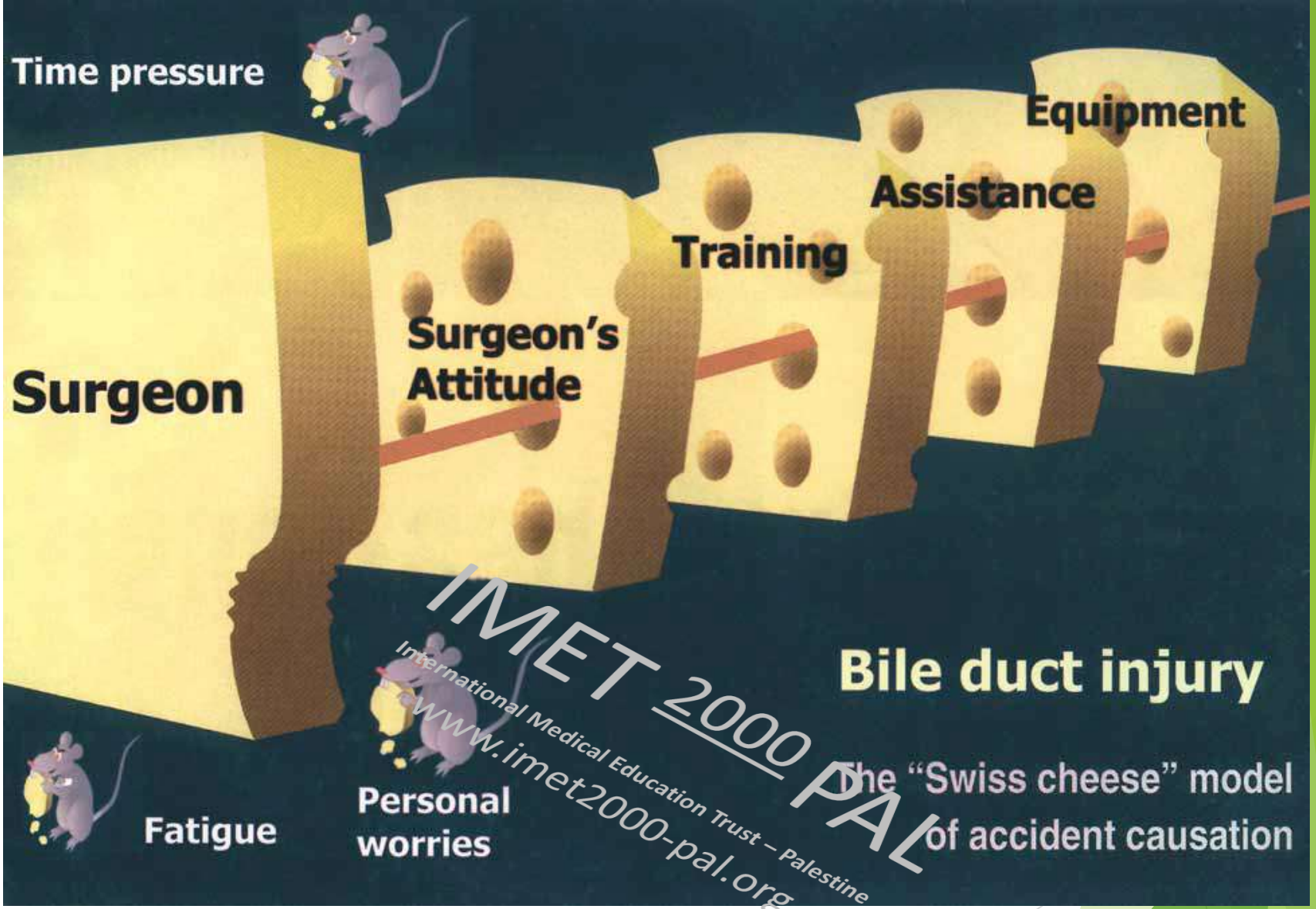
“False hypothesis” ..... “ deadly mind set” ..... “Functional fixity” .....

(to set a hypothesis and work to confirm it)



A surgeon develop functional fixity ... And reject the evidence !!

Where is the assistant **?? Do you register the op**??? Do you review it as a team **... Do you take free lessons** ??



The Swiss cheese model ... Every hole is a **latent error**.. Leading to the final barrier " surgeon" .. Any hole is an **ACTIVE ERROR**

The Swiss cheese barrier

Surgical equipment: No quality .. No surgery

Good assistant : Train, encourage and respect

Surgical training

Surgical attitude : .....

Surgeon's error

Surgical attitude

A low risk surgeon should be:

Well trained, with skills, knowledge, morals and values

Expect unpleasant surprises

Accept input from others, ready to modify hypothesis

Understand the effect of fatigue, time pressure and worries

Encourage others to express their views and respect them.

CONCLUSIONS

CBI is a clinical reality

It may lead to serious disasters

Incidence should be kept < 0.3%

Multi factorial , from equipments to surgeons

No to name and shame philosophy

We need low risk operators and not operators only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Thank you