

International Atomic Energy Agency Scientific Forum

A Decade of Action on **Cancer Control** and the Way Forward



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Vienna International Centre
Board Room D, C Building, 4th Floor

Evolution of medical imaging
-Role of imaging in informing
clinical decisions: liver cancer

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My Grandfather “Raisuke Shirabe” was a survivor after Atomic Bomb in Nagasaki



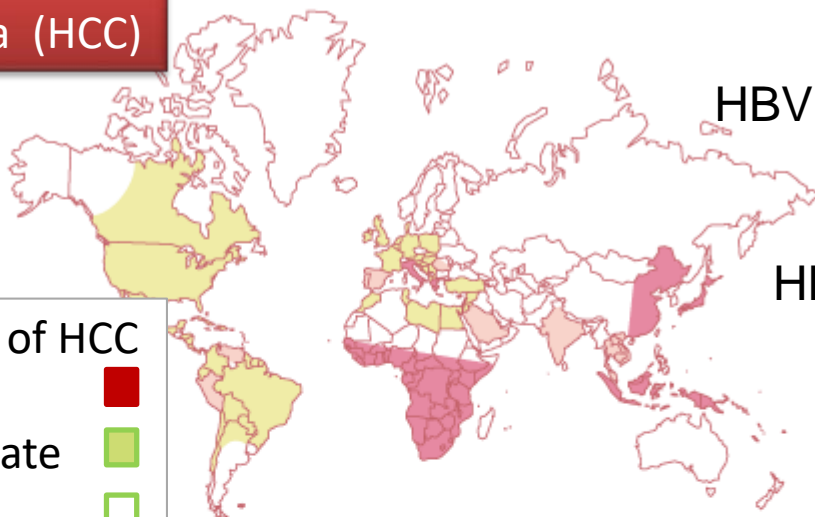
More than 850 of medical students, staffs, and patients died .
414 of 580 students (71%) died.

Nagasaki Medical College
was completely destroyed.



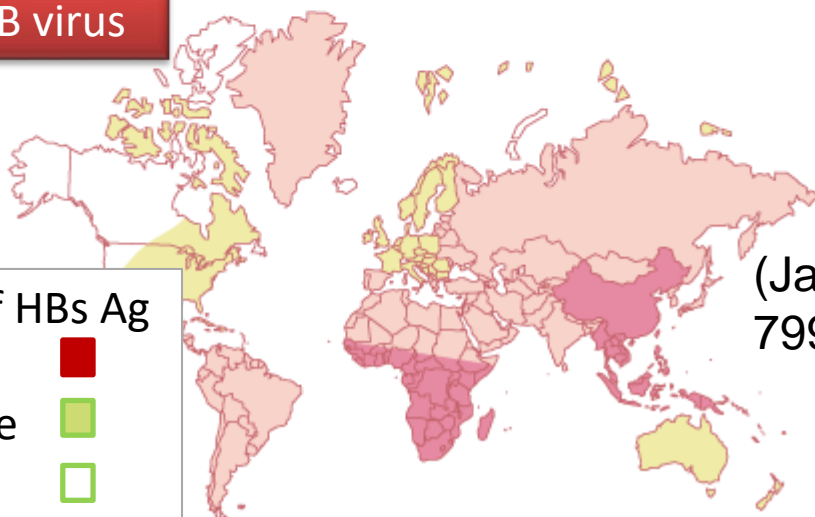
HCC and hepatitis virus: world distribution

Hepatocellular carcinoma (HCC)



Incidence of HCC
High ■
Intermediate ■
Low □

Hepatitis B virus

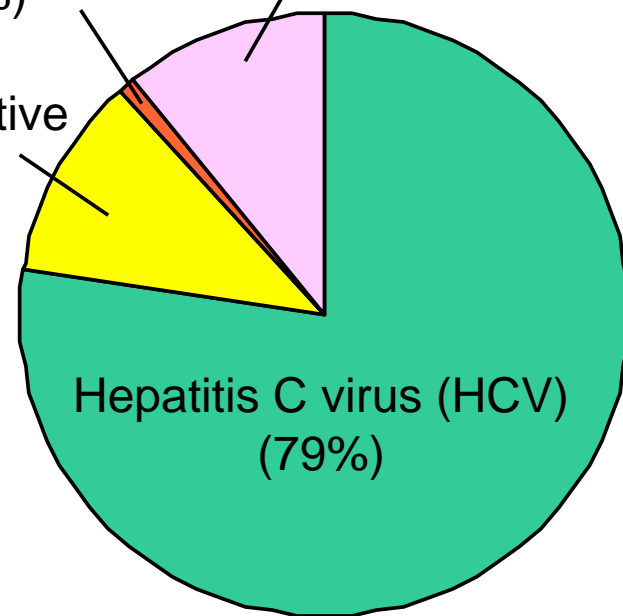


Incidence of HBs Ag
High ■
Intermediate ■
Low □

HBV and HCV positive (1%)

HBV positive (11%)

nonBnonC (11%)



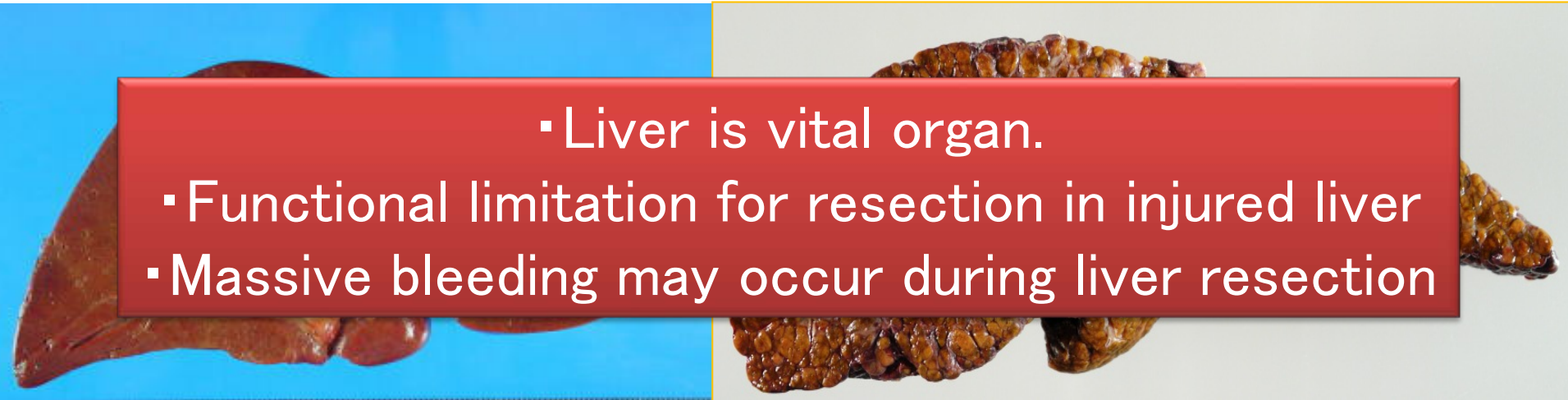
Hepatitis C virus (HCV) (79%)

(Japan Liver Cancer Society: Kanzo 41; 799-811, 2000.)

Number of sufferers: more than 700,000 people in the world per year.



Liver cancer (Hepatocellular carcinoma: HCC) often occurs in injured liver.

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- Liver is vital organ.
 - Functional limitation for resection in injured liver
 - Massive bleeding may occur during liver resection

Liver Cirrhosis

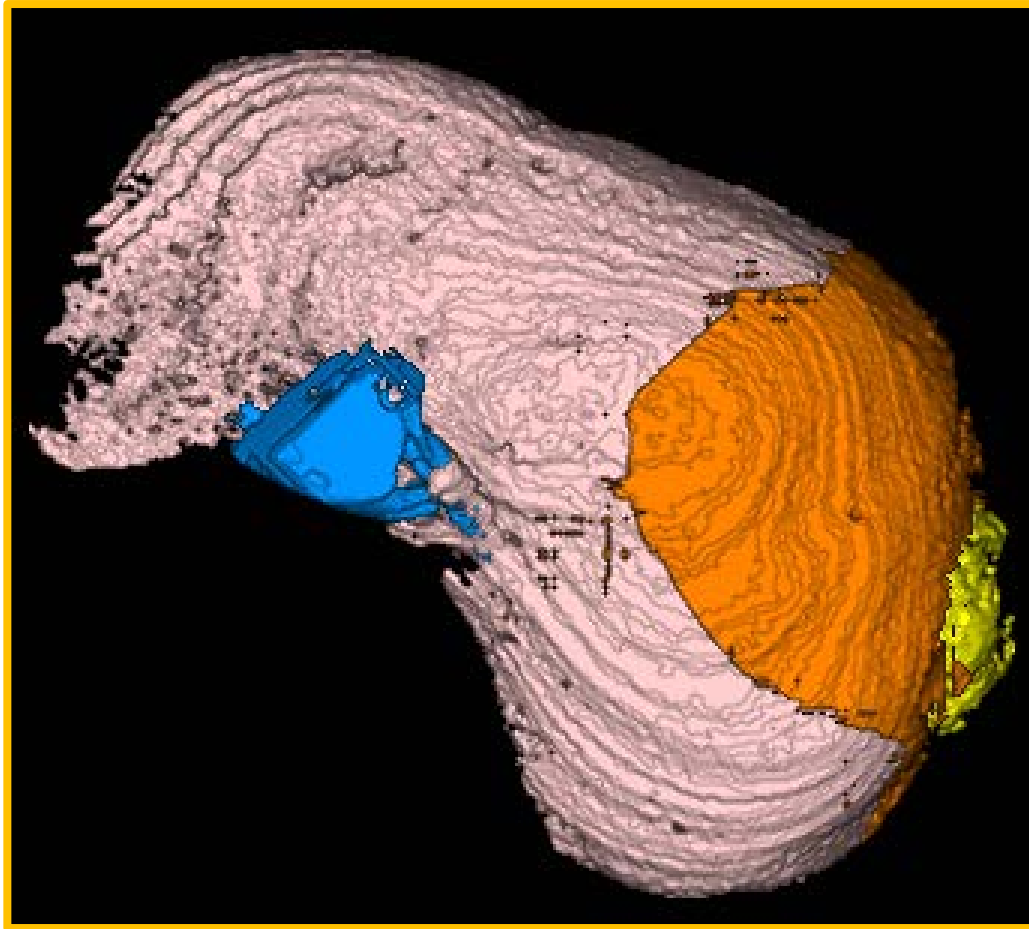
- HCV
- HBV
- Alcohol
- Fatty liver
- Cholestasis



For safe hepatectomy,
To simulate precise simulation
To reduce blood loss
are essential.



Simulation before hepatic resection, using 3D imaging

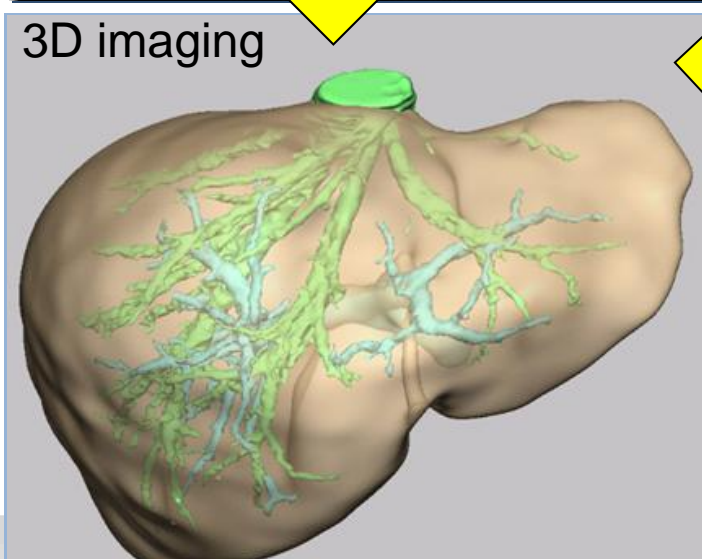
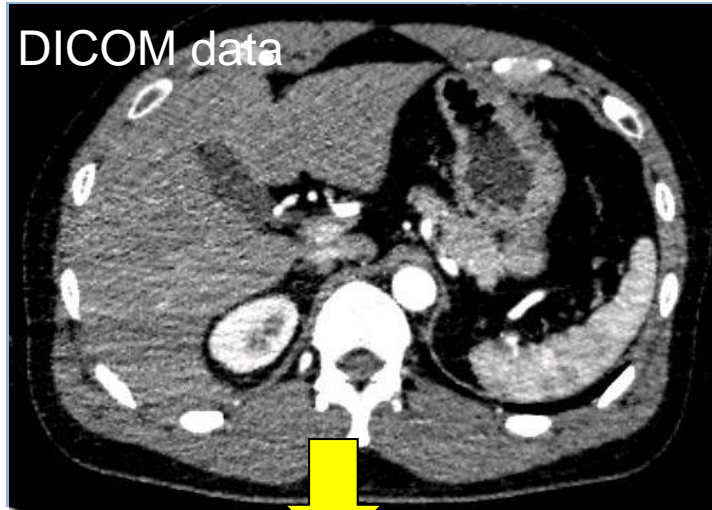


Estimated resection volume, and residual liver volume after hepatectomy, blood vessels, which would be cut during resection can be simulated.

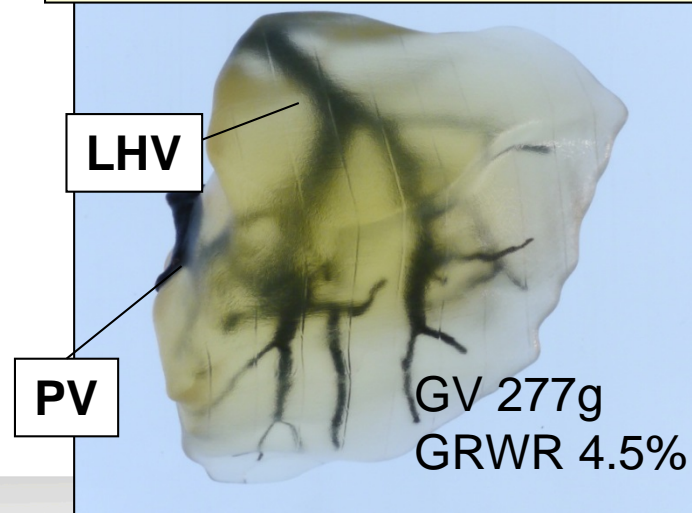


Preoperative simulation of liver surgery, using Bio-Texture Modeling

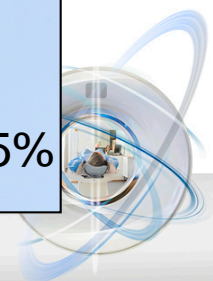
Forming of 3D model, using 3D printer



Left lateral segment graft (Full-length)



Joint research with Prof. Maki Sugimoto, Teikyo University



The making of 3D imaging

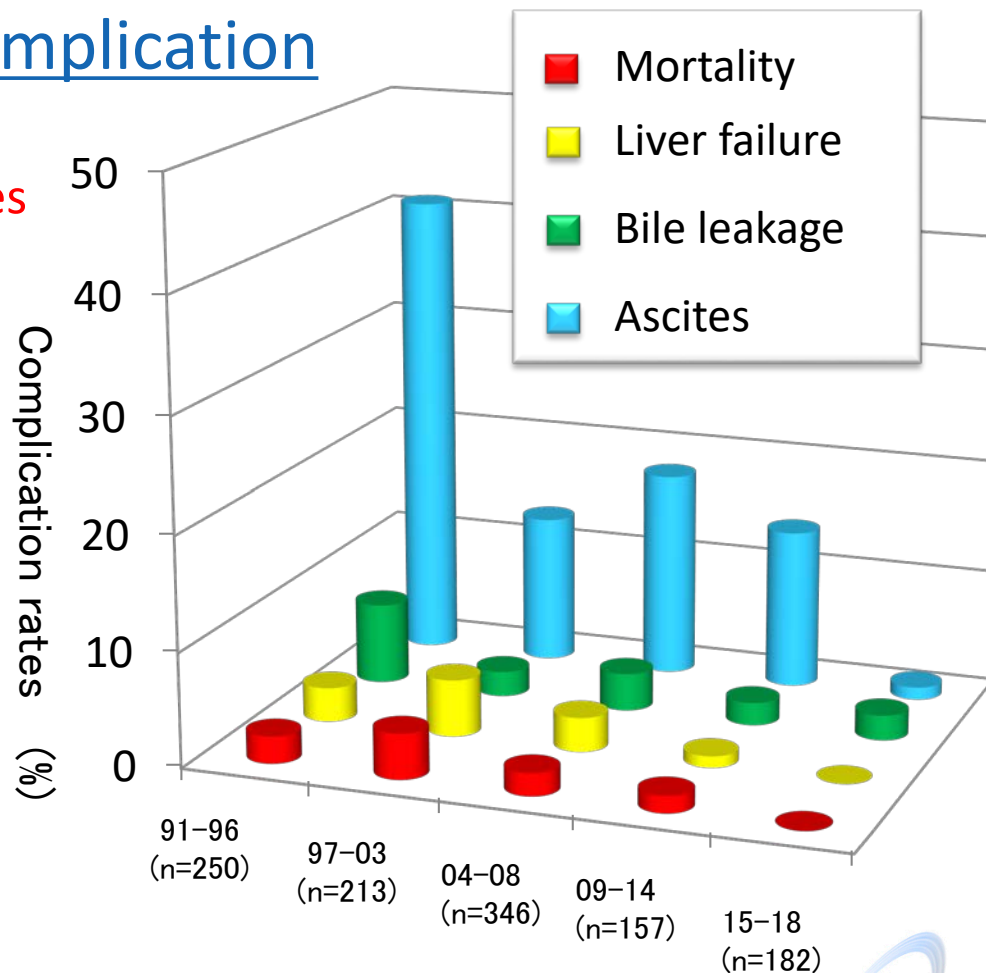
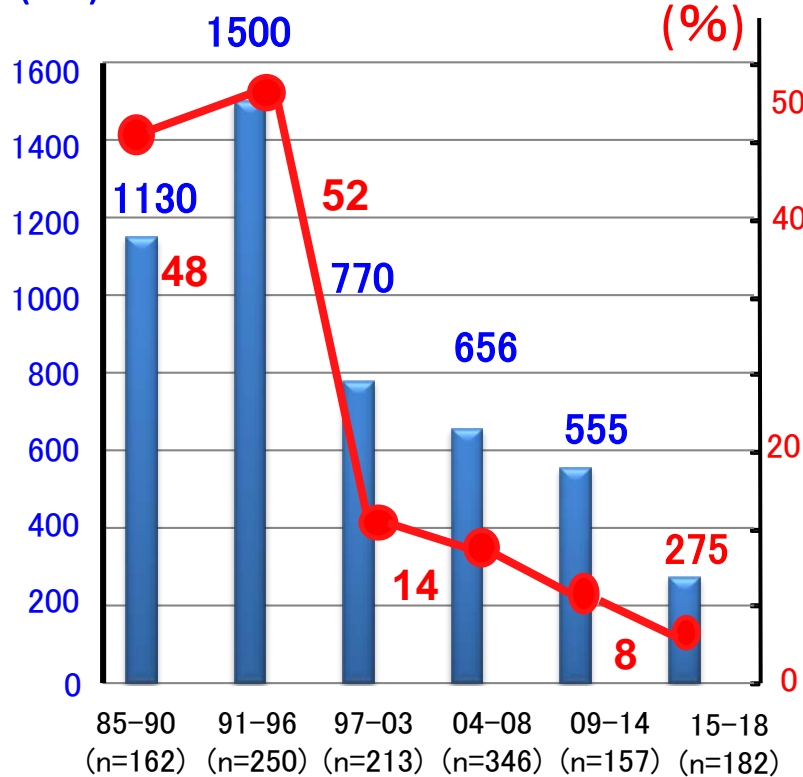


Changes in blood loss, transfusion rates

and postoperative complication

Blood loss
(ml)

Blood
transfusion rates
(%)



Mortality
0%