Cognition-Guided Surgery

A New Paradigm?

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Autonomous Cars
Surgery Yesterday
Surgery Today
Tissue Sealing Devices

LigaSure Impact™
Surgery Today
Robotic Assistance

Da Vinci™, Intuitive Surgical, Inc., USA
Surgery Today
Robotic Assistance

- Ergonomic position
- 3D Visualization
- Intuitive guidance
- Endowrist-Instruments
- Downscaling of movements
- Tremor filter

Da Vinci™, Intuitive Surgical, Inc., USA
Surgery Today
Intraoperative Imaging
Surgery Today in Use
Hepatocellular Carcinoma

- M, 62a
- HCC Segm. 6
- 1.9 cm
- Hepatitis C
- Child A
Computer-Based Assistance
State-of-the-Art

- Intruments
- Imaging
- Robotics
- Navigation
- Integration

Cognition-Guidance
Reality in Surgery Today
Overwelving Knowledge and Information
Computer-based, **integrated** system, that

- Perceives information,
- Interprets information based on a knowledge base and
- Performs a context-sensitive action
Cognition-Guided Surgery

Clin. experience
Factual knowledge

Augmented Reality

Cognitive System

High-Tech & Robotics

Patient Data Imaging
Cognition-Guided Surgery

Perception → Interpretation → Action

Knowledge Base
Cognition-Guided Liver Surgery

Knowledge Base

Perception → Interpretation → Action

Studies → Functional data → OP Strategien → Laboratory test and histopathologic parameters → Surgical data

Images

Outcome data

Therapy proposal:
- Surgery
- Multimodal
- EXIT Strategy
Cognition-Guided Cholecystectomy
Cognition-Guided Camera-Guidance

A Learning Camera Robot for Laparoscopic Surgery
Surgical Robot Challenge 2015

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Future Cognition-Guided Surgery?
However

Do not forget the patient!