20th VASCULAR SOCIETY OF EGYPT
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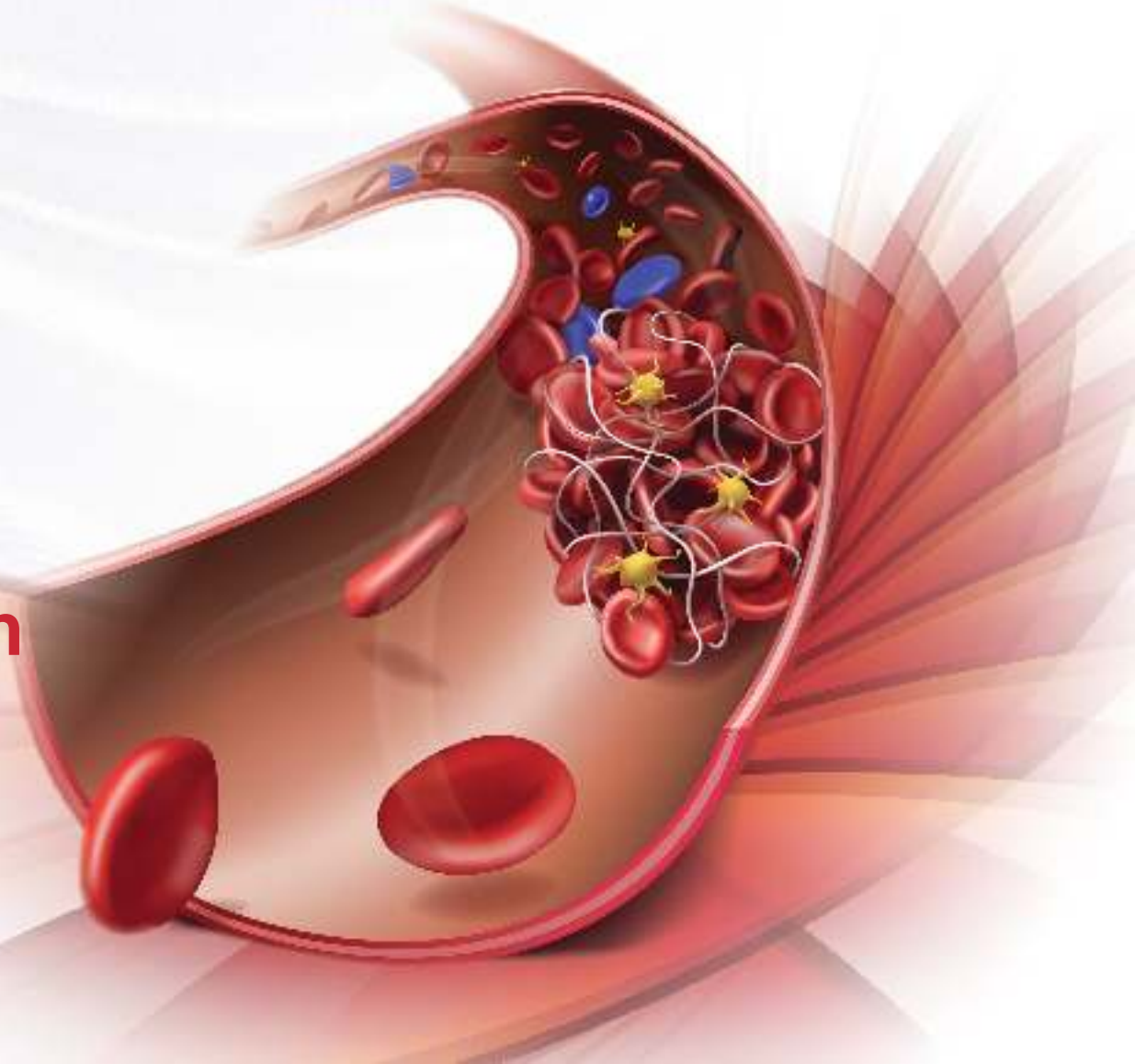
In Collaboration With

7th ANNUAL AL-AZHAR VASCULAR
SURGERY CONFERENCE

EVIDENCE BASED
VASCULAR PRACTICE



Impact of Artificial Intelligence on aortic interventions

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Contents

- Definition of AI
- Examples of AI
- Applications of AI in aortic disease

  Pre operative

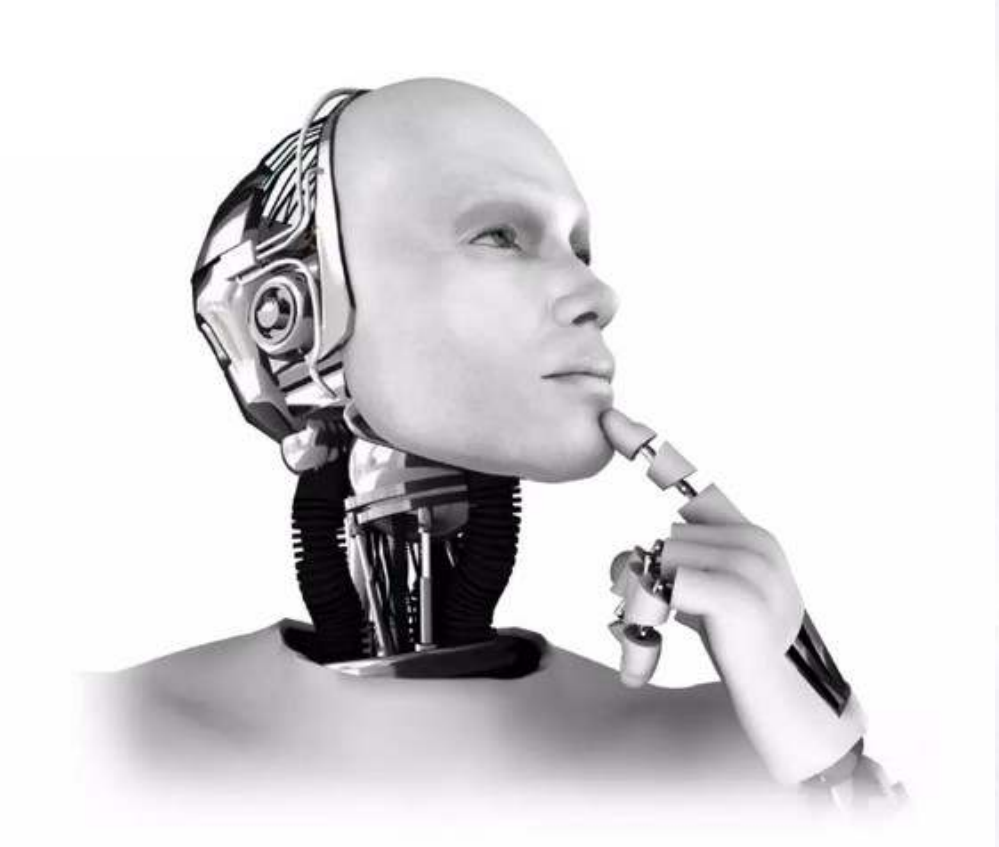
  intra operative

  post operative

What is artificial intelligence

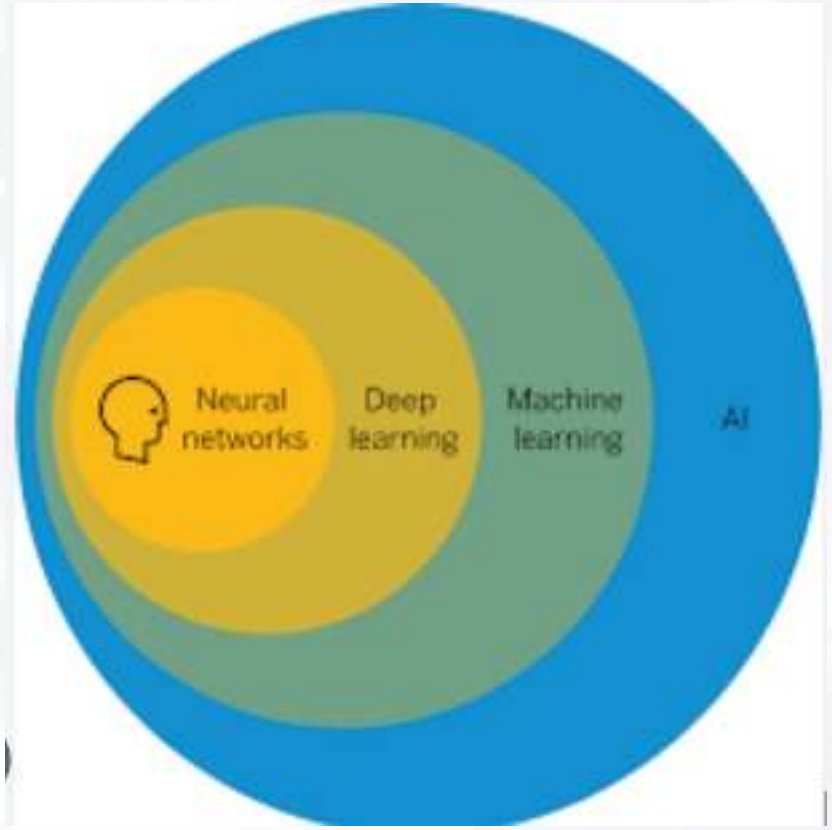
- Definition:

- The capability of a machine to imitate intelligent human behavior



AI ,ML ,DL , and NN

- They are different levels of AI levels



AI tools in aortic dissease

1-Preoperative AI tools

2-Intraoperative AI tools

3-Postoperative AI tools

Preoperative AI

- Prediction of growth of AAA
- Prediction of post operative mortality after open AAA repair
- Prediction of rupture of AAA
- Automatic measurements of CTA of AAA using endosize software

Can we predict growth of AAA?

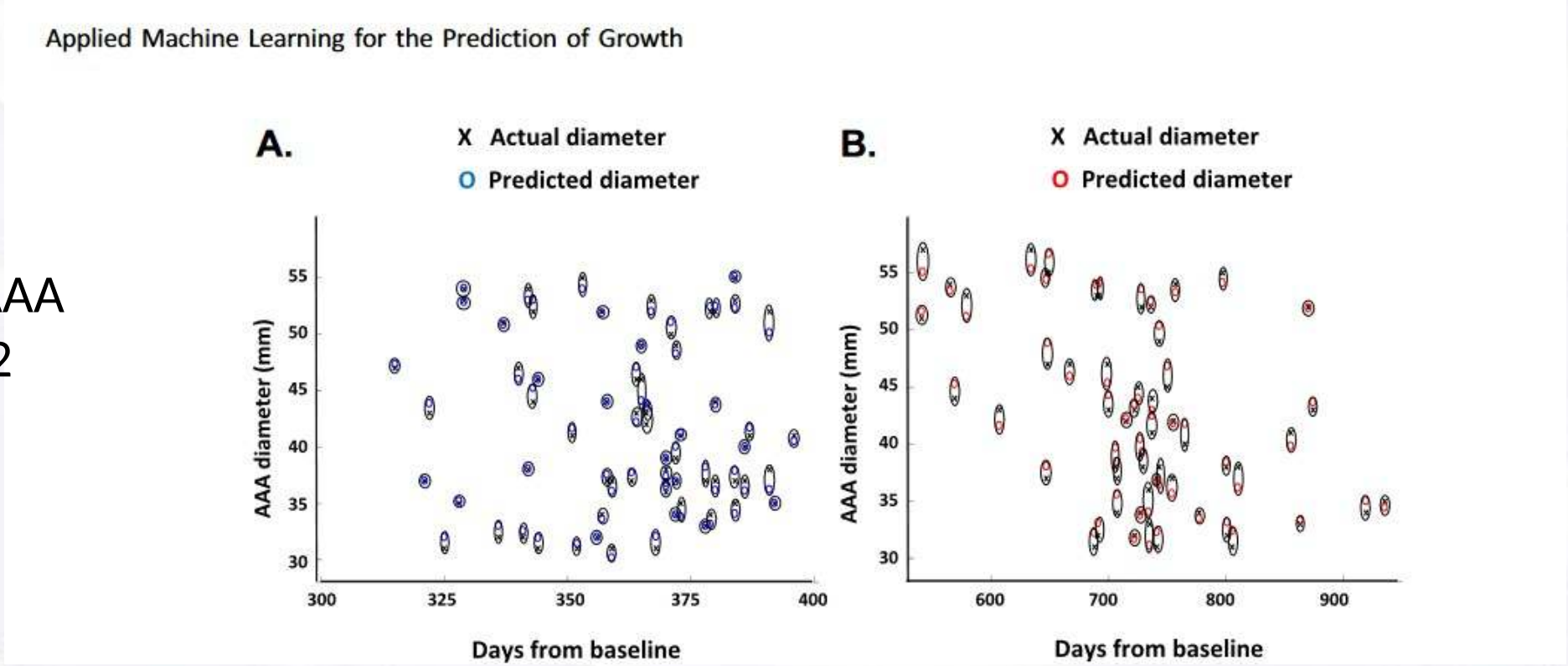
ORIGINAL RESEARCH

Applied Machine Learning for the Prediction of Growth of Abdominal Aortic Aneurysm in Humans

R. Lee [a,*,†], D. Jarchi [b,†], R. Perera [c], A. Jones [a], I. Cassimjee [a], A. Handa [a,‡], D.A. Clifton [c,‡], on behalf of the Oxford Abdominal Aortic Aneurysm Study and the Oxford Regional Vascular Service

Actual and predicted diameters

Can predict the AAA diameter within 2 mm in 85% of patients

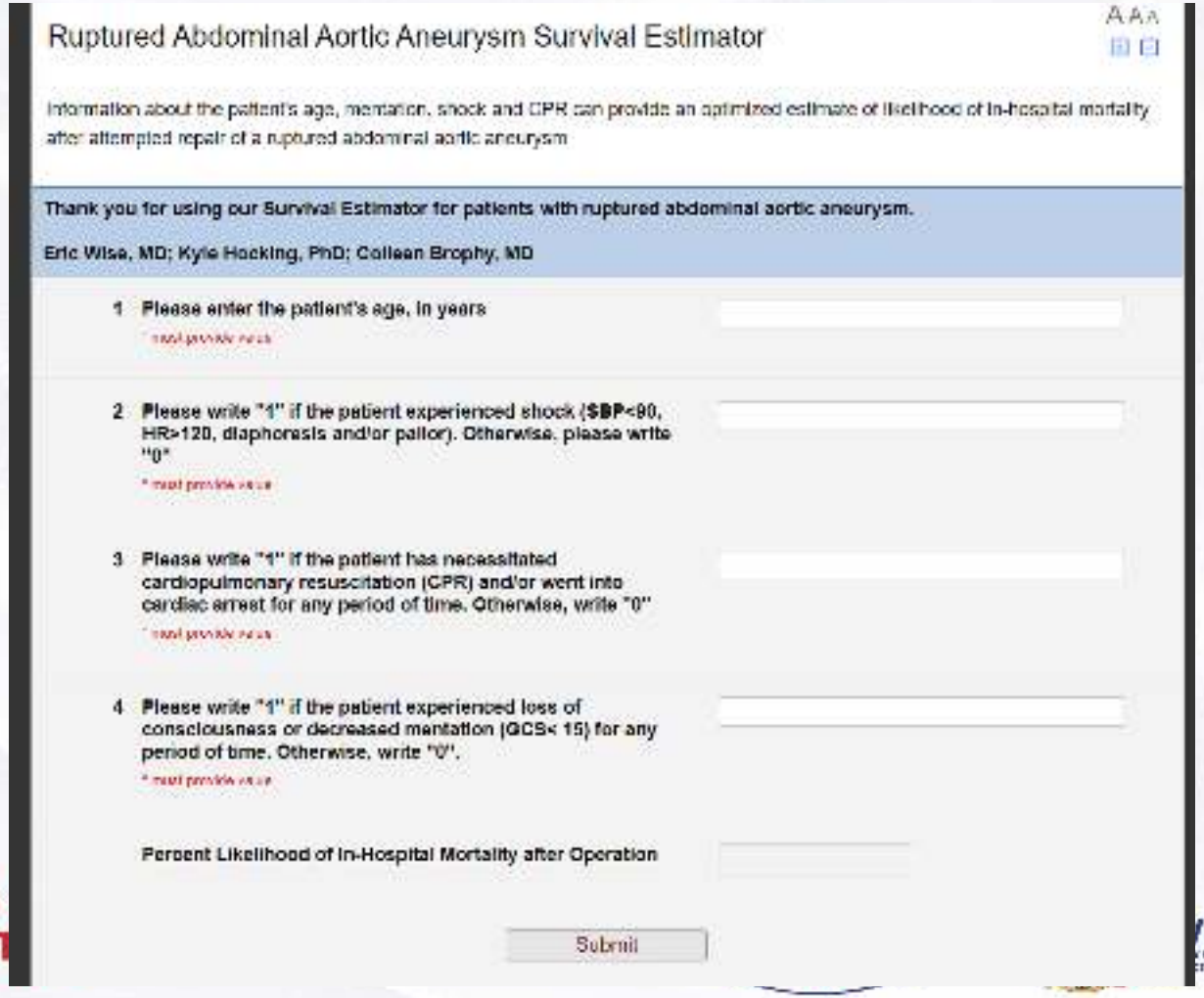


Can we predict mortality?

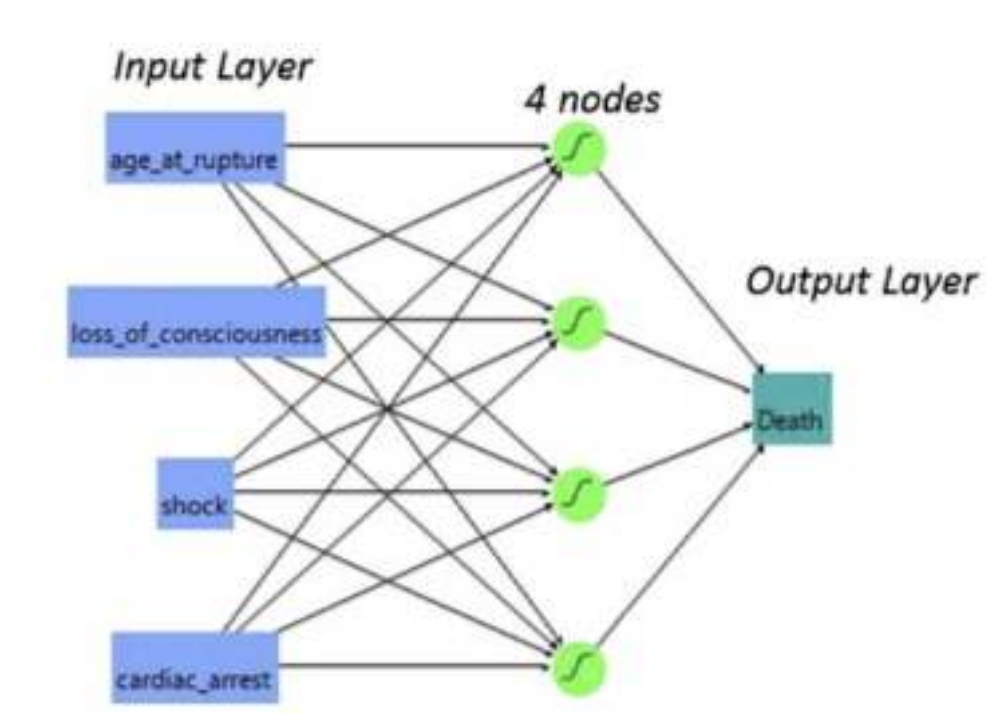
FULL TEXT ARTICLE

Prediction of in-hospital mortality after ruptured abdominal aortic aneurysm repair using an artificial neural network

- An ANN-based predictive model may represent a simple, useful, and highly discriminant adjunct to the vascular surgeon in accurately identifying those patients who may carry a high mortality risk from attempted repair of rAAA, using only easily definable preoperative variables.

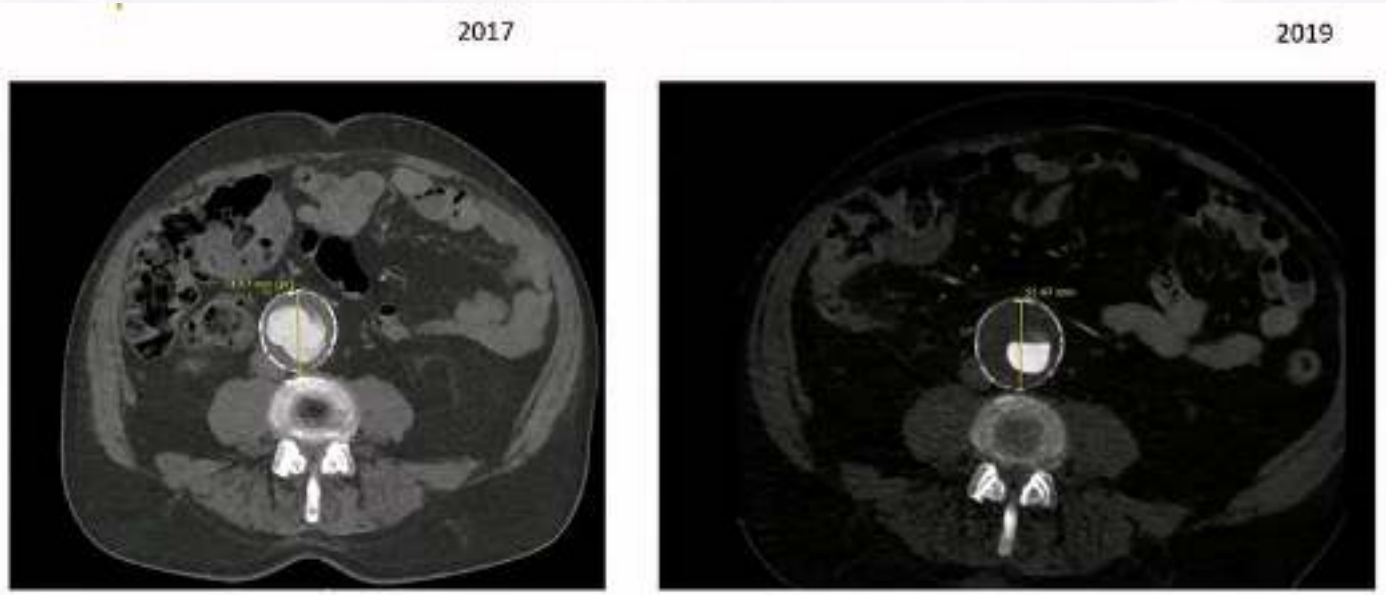


- Artificial neural network for death in rAAA



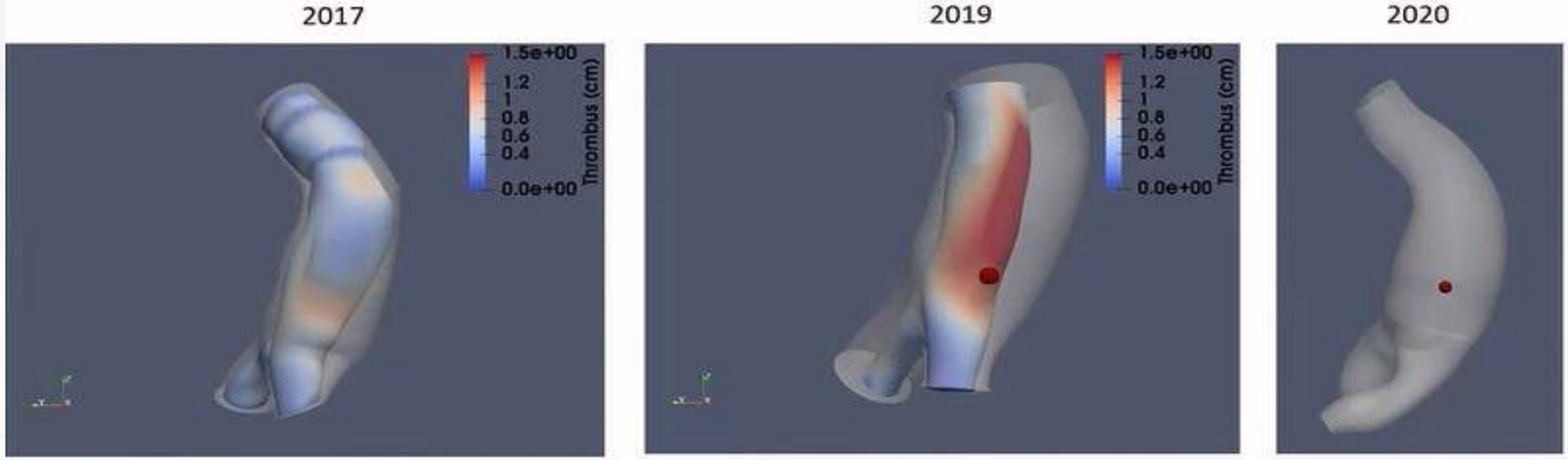
Automatic segmentation of AAA thrombus

- AAA have the same size 51 mm but increase aortic thrombus



AAA thrombus segmentation

Automatic analysis of thrombus



Data Amsterdam UMC

And guess what ?

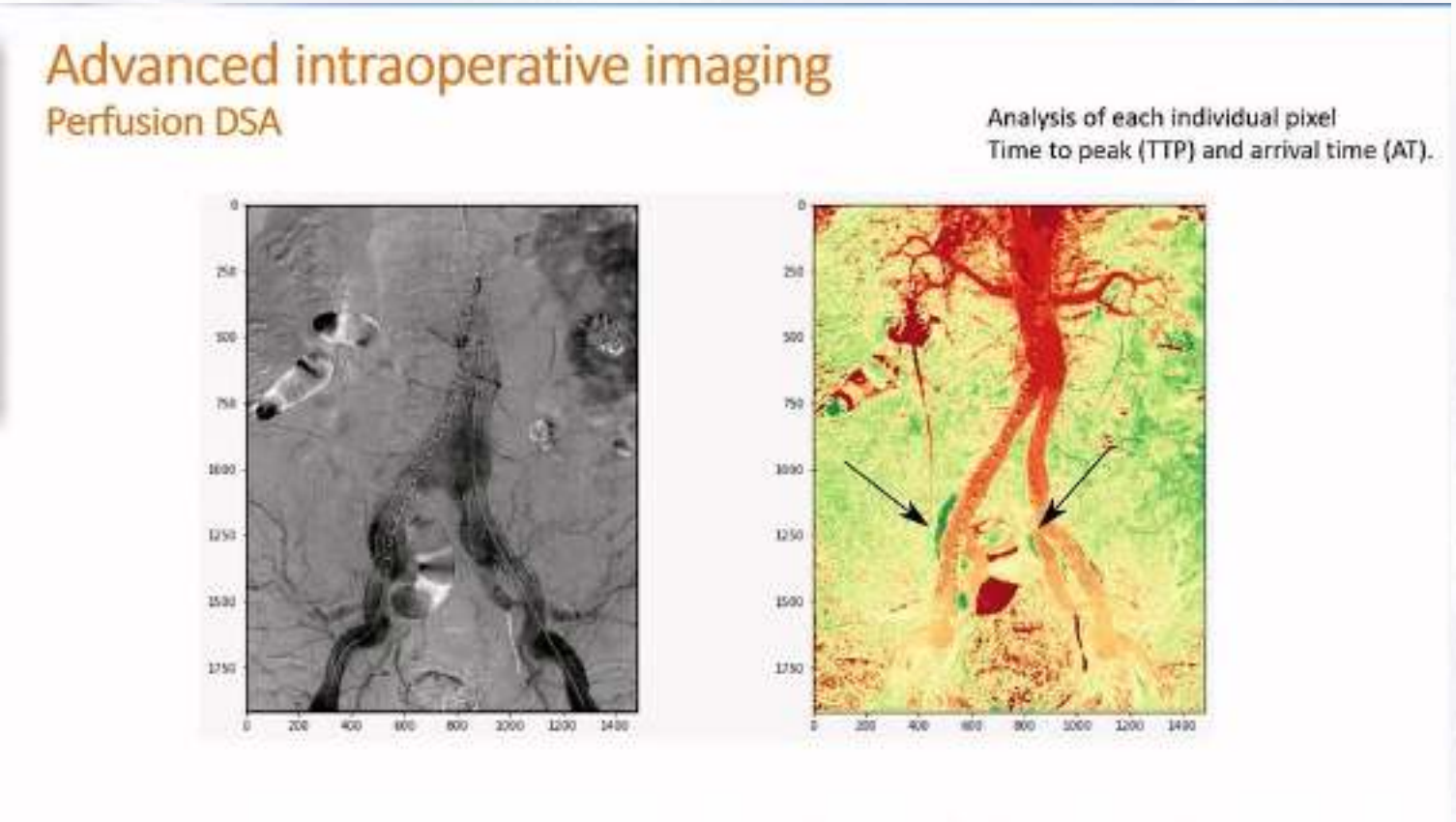
- It ruptures at the exact point of the thickened thrombus

Intraoperative AI

2-Intraoperative AI tools

Detection of endoleaks type 2 during EVAR

- AI can look at each pixel of the image and detect endoleaks type 2

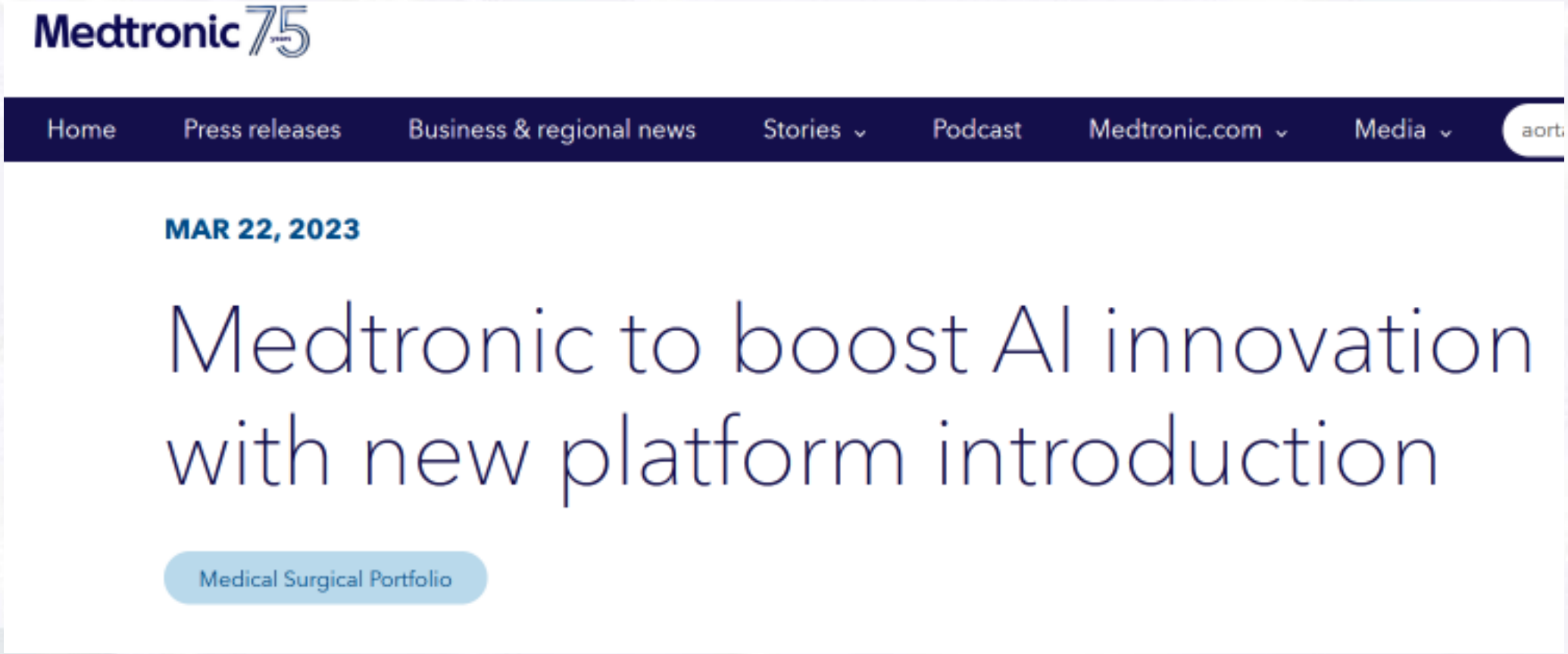


Postoperative AI

3-Postoperative AI tools

- Can create a custom made , postoperative follow-up scheme using big data model

Medtronic AI tools



Which AI tools can be used in Aorta?

1. **Medtronic's AI-assisted tools**: These tools can analyze imaging data to provide recommendations for the best treatment options based on patient-specific anatomy.
2. **Cerenovus**: Offers AI solutions for surgical planning and vascular assessment.
3. **Quanta**: Uses AI algorithms to help predict patient outcomes and recommend appropriate interventions.
4. **HeartFlow**: While primarily focused on coronary artery disease, it involves decision-support systems that can sometimes be adapted for vascular applications.
5. **Varian's AI tools**: These offer insights into vascular pathologies that can guide treatment strategies.

Future is here

US probe holder

Video and fig. courtesy of Jonas Osburg Institut for Robotic and Cognitive System, Universität of Lübeck

Conclusion

- AI will sure play a great rule in all vascular surgery fields
- AI can use big data with the large processing power
- AI will improve vascular services and help clinicians to improve vascular services
- We all must use AI every day

•Thank you