openEHR-Based Representation of Guideline Compliance Data through the Example of Stroke Clinical Practice Guidelines

by

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Background

Challenge: Combining the electronic health record effectively with clinical decision support.

Potential solution: Semantic interoperability between different electronic health records, since that could facilitate widespread use of available decision support components.

Requirement: Suitable architecture of shareable electronic health records.

Focus

- Electronic health record platform: openEHR.
- Clinical decision support type: evidence-based clinical practice guidelines.
- Modelling of practice guidelines and compliance criteria.
- Collecting archetypes for acute stroke setting.

Aim and Importance

Aim: To assess the use of openEHR concepts, particularly CARE_ENTRY archetype classes, in modelling clinical practice guidelines and compliance data.

Importance: openEHR's usefulness in the domain of modelling practice guidelines is not well studied yet.

Materials and Methods

Guidelines for Management of Ischaemic Stroke and Transient Ischaemic Attack 2008

The European Stroke Organization (ESO) Executive Committee and the ESO Writing Committee

Peter A. Ringleb, Heidelberg, Germany; Marie-Germaine Bousser, Paris, France; Gary Ford, Newcastle, UK; Philip Bath, Nottingham, UK; Michael Brainin, Krems, Austria; Valeria Caso, Perugia, Italy; Álvaro Cervera, Barcelona, Spain; Angel Chamorro, Barcelona, Spain; Charlotte Cordonnier, Lille, France; László Csiba, Debrecen, Hungary; Antoni Davalos, Barcelona, Spain; Hans-Christoph Diener, Essen, Germany; José Ferro, Lisbon, Portugal; Werner Hacke, Heidelberg, Germany; Michael Hennerici, Mannheim, Germany; Markku Kaste, Helsinki, Finland; Peter Langhorne, Glasgow, UK; Kennedy Lees, Glasgow, UK; Didier Leys, Lille, France; Jan Lodder, Mastricht, The Netherlands; Hugh S. Markus, London, UK;

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Utilising the Magic Library tab control from Crownwood at www.dotnetmagic.com

Procedure (1/3)

(1) Guideline text → VUE visualisation.

(2) Verification of visualisation with stroke physician.

(3) Iteration of (1) and (2).

Procedure (2/3)

Visualisation is based on activities and conditions between the activities.

Activities are nodes and conditions connect nodes.

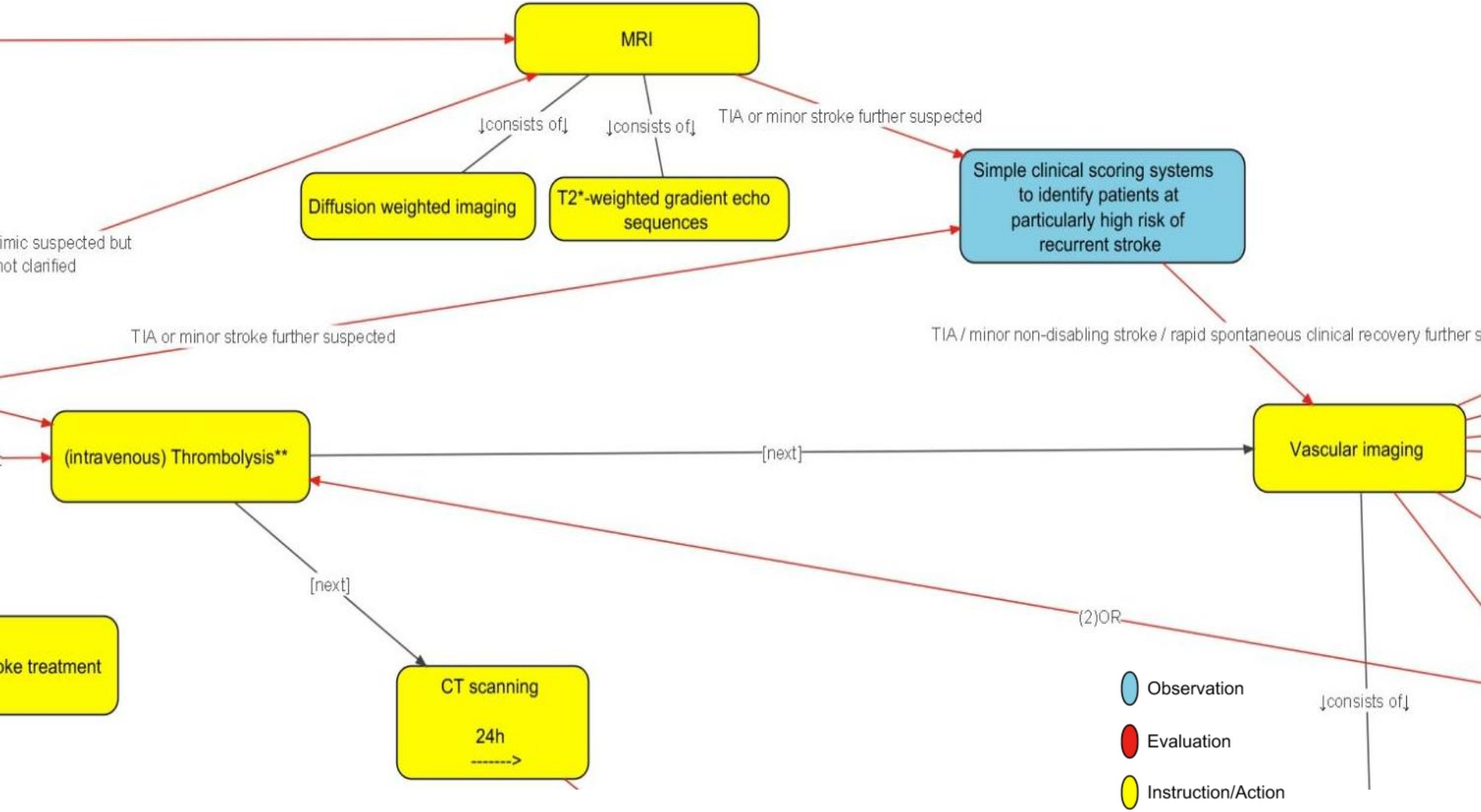
Activities are divided into CARE_ENTRYs: OBSERVATIONS, EVALUATIONS and INSTRUCTIONS/ACTIONS.

Procedure (3/3)

Visualisation used to identify and author archetypes.

Materials from neurologists used to identify and author archetypes in compliance criteria.

Results (1/2)


MRI
↓consists of↓
↓consists of↓
TIA or minor stroke further suspected
Diffusion weighted imaging
T2*-weighted gradient echo sequences
Simple clinical scoring systems to identify patients at particularly high risk of recurrent stroke
imic suspected but
ot clarified
TIA or minor stroke further suspected
TIA / minor non-disabling stroke / rapid spontaneous clinical recovery further s
(intravenous) Thrombolysis**
[next]
Vascular imaging
[next]
(2)OR
ke treatment
CT scanning
24h
------->
Observation
Evaluation
Instruction/Action
↓consists of↓

Results (2/2)

- Thinking in terms of openEHR CARE_ENTRY classes was helpful in modelling clinical practice guidelines and compliance data as well as identifying needed knowledge components.

- The resulting visualisation was helpful in presenting medical informatician's understanding of the guidelines to physician.

- Collection of archetypes for acute stroke care (existing + new).

Conclusion

openEHR concepts are worth studying further to find out how suitable they are for achieving evidence-based clinical decision support that can improve healthcare.

Discussion / Future Directions

Is such a visualisation helpful as an intermediate step/general-purpose language in authoring computer-interpretable guidelines?

Can such a visualisation be used to locate discrepancies between different sets of guidelines (e.g. international and local)?

How feasible is an openEHR-based implementation for guideline execution?

Thank you for your attention!

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