53E CONGRÈS SFCCF 2021

5-6 NOVEMBRE 2021

WTC - GRENOBLE

CONGRÈS DE LA SOCIÉTÉ FRANÇAISE DE CARCINOLOGIE CERVICO-FACIALE

SFCCF
Société Française de Carcinologie Cervico-Faciale

Intérêt de l'IRM de diffusion en cancérologie des voies aérodigestives supérieures

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GeodAIsics

CHU GRENOBLE ALPES

Declaration of Financial Interests or Relationships

Speaker Name: **Arnaud Attyé**

I have the following financial interest or relationship to disclose with regard to the subject matter of this presentation:

Company Name: GeodAIsics
Type of Relationship: Co-Founder

INTRODUCTION

Review > World J Surg Oncol. 2021 Oct 28;19(1):314. doi: 10.1186/s12957-021-02423-y

A systematic review of proteomic biomarkers in oral squamous cell cancer

[redacted]

Affiliations + expand

PMID: 34711248 DOI: 10.1186/s12957-021-02423-y

Review > Curr Opin Oncol. 2021 May 1;33(3):178-185. doi: [redacted]

Perspectives in pathomics in head and neck cancer

[redacted]

Affiliations + expand

PMID: [redacted] DOI: [redacted]

> Int J Radiat Oncol Biol Phys. 2021 Nov 1;111(3):692-702. doi: [redacted]. Epub 2021 Jul 31.

Framework for Machine Learning of CT and PET Radiomics to Predict Local Failure after Radiotherapy in Locally Advanced Head and Neck Cancers

[redacted]

Affiliations + expand

PMID: [redacted] DOI: [redacted]

Explainable Boosting Machine Model with a Parallel Ensemble Design Predicts Local Failure for Head and Neck Cancer With Clinical, CT, and Delta CBCT Radiomic Features

[redacted]

Affiliations + expand

PMID: [redacted] DOI: [redacted]

Review > Can Assoc Radiol J. 2021 Feb;72(1):73-85. doi: [redacted]. Epub 2020 Jul 31.

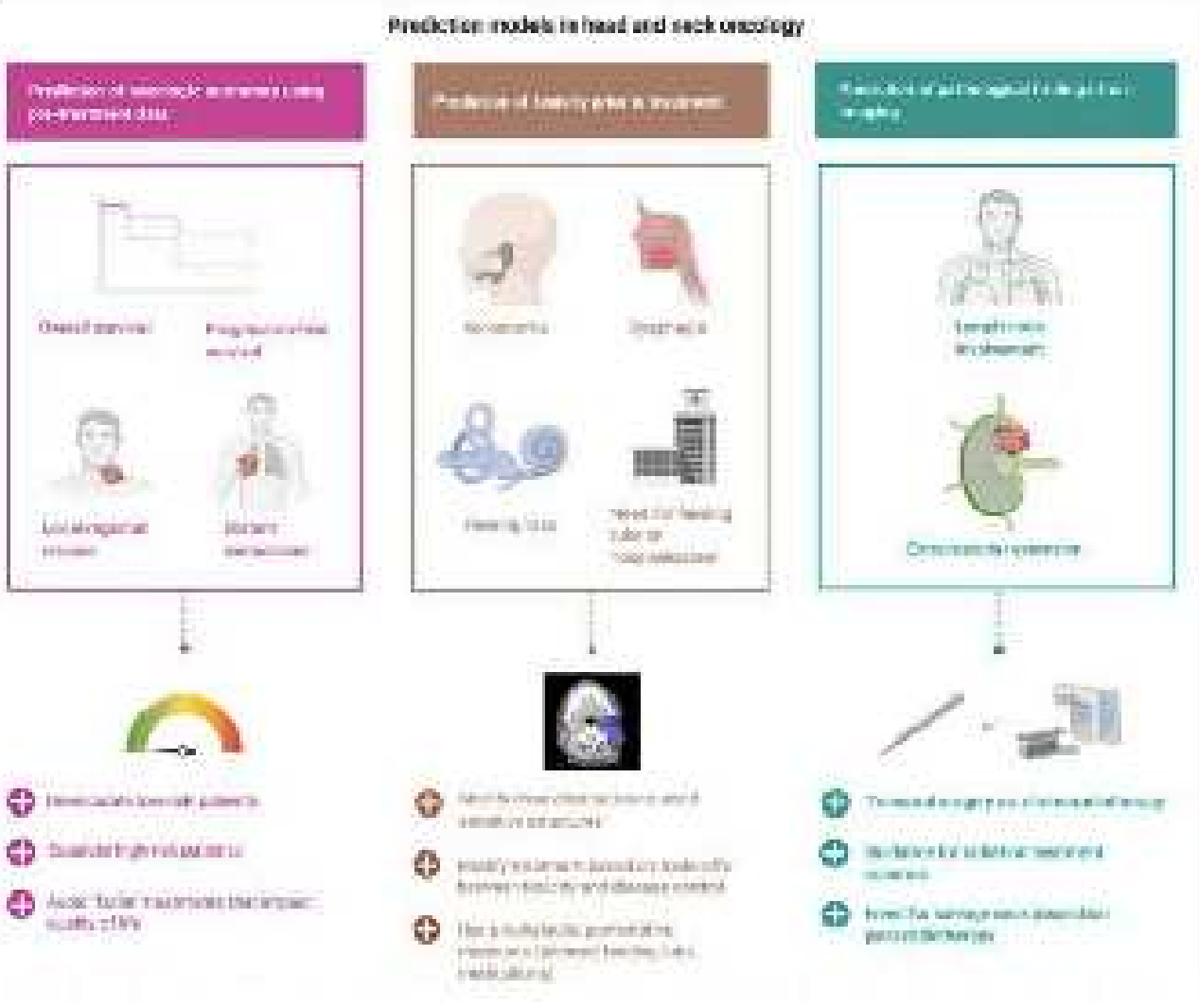
Utilizing Artificial Intelligence for Head and Neck Cancer Outcomes Prediction From Imaging

[redacted]

Affiliations + expand

PMID: 32736462 DOI: [redacted]

INTRODUCTION



Chinnery et al., Can Assoc Radiol J, 2021

INTRODUCTION

Suv / ADC? / CT Density

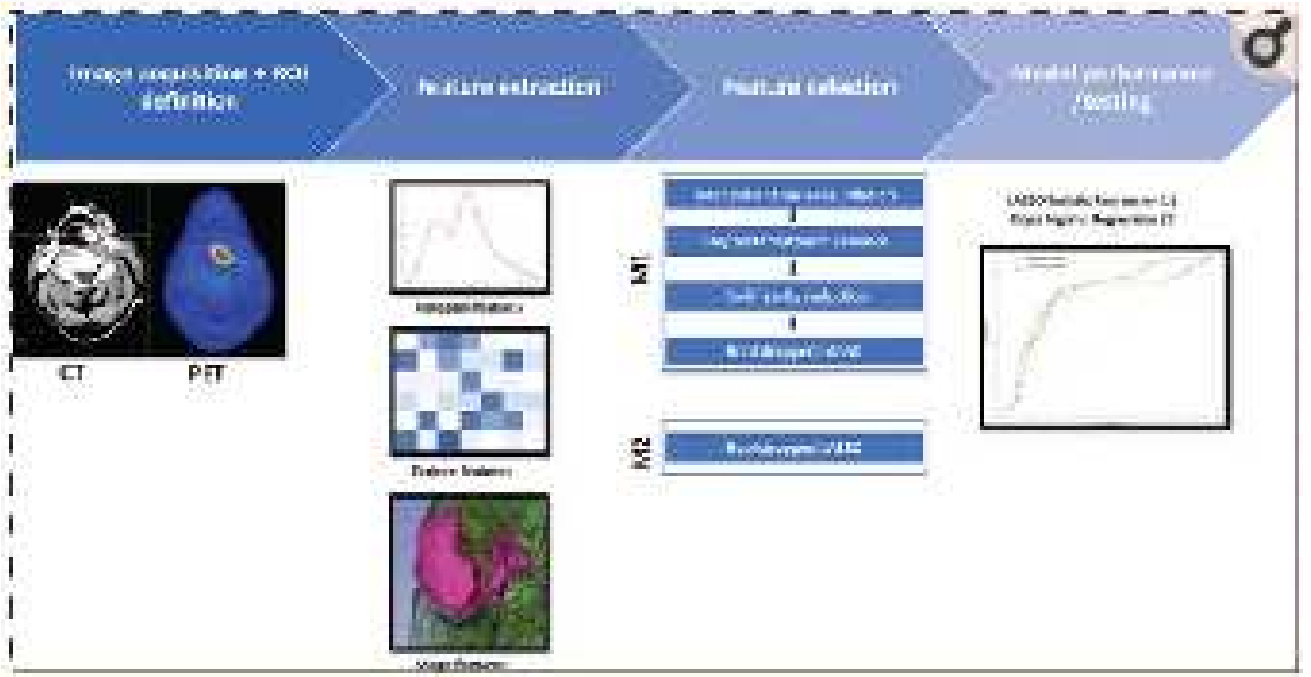
Tumor Volume

Past History

Age/Sex

Pathology

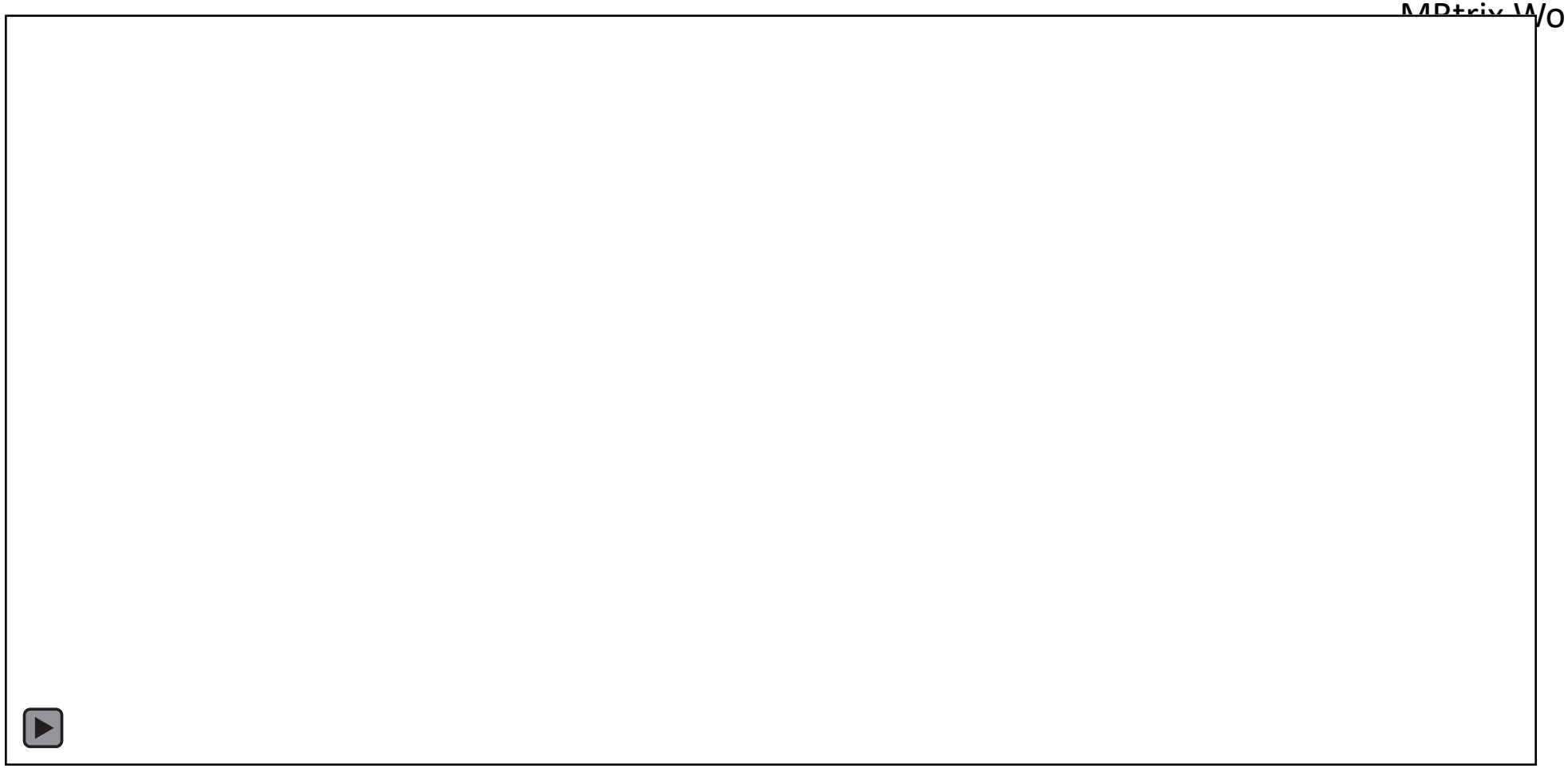
Clinical Markers



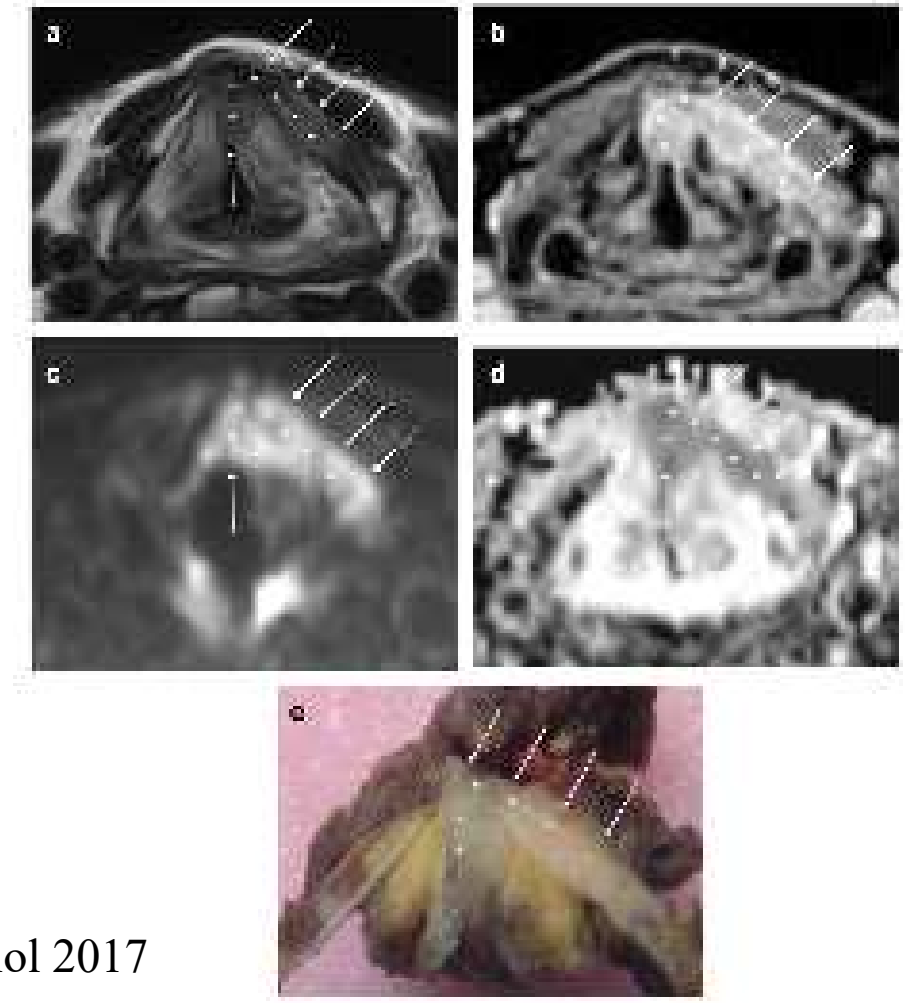
Math Markers

INTRODUCTION

MRtrix Workshop



DWI



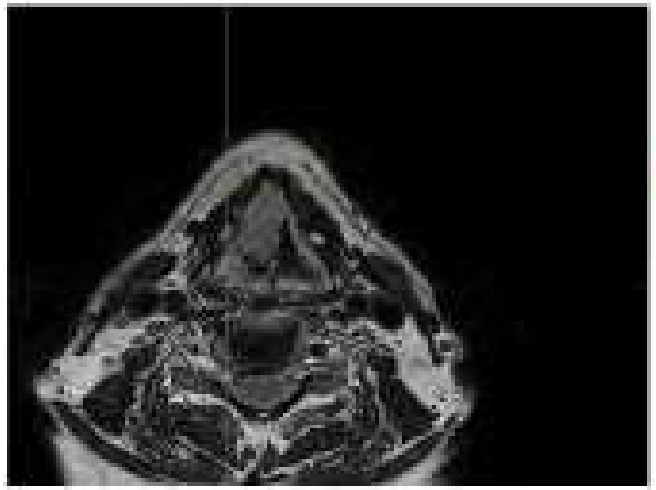
Morphological MRI

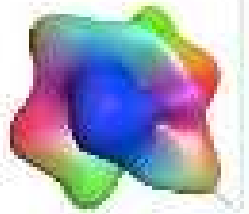
Diffusion MRI

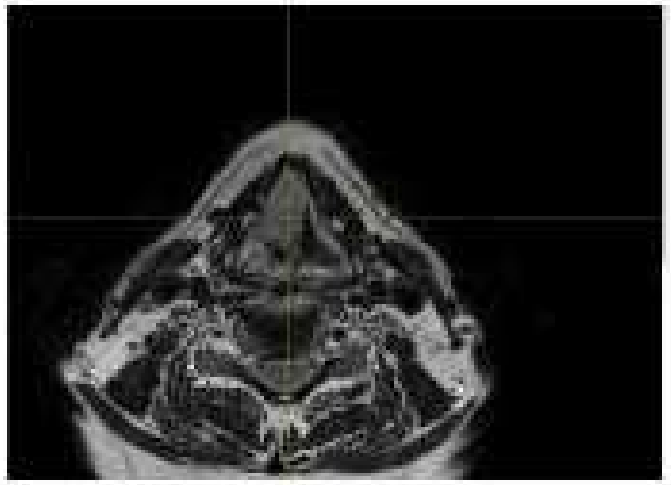
Pathology

Preda et al., Eur Radiol 2017

DWI







- ADC élevé
  - (Graisse)
  - Prolifération faible
  - Important contingent stromal
  - HPV 16 –
  - Nécrose tumorale

  Mauvais pronostic

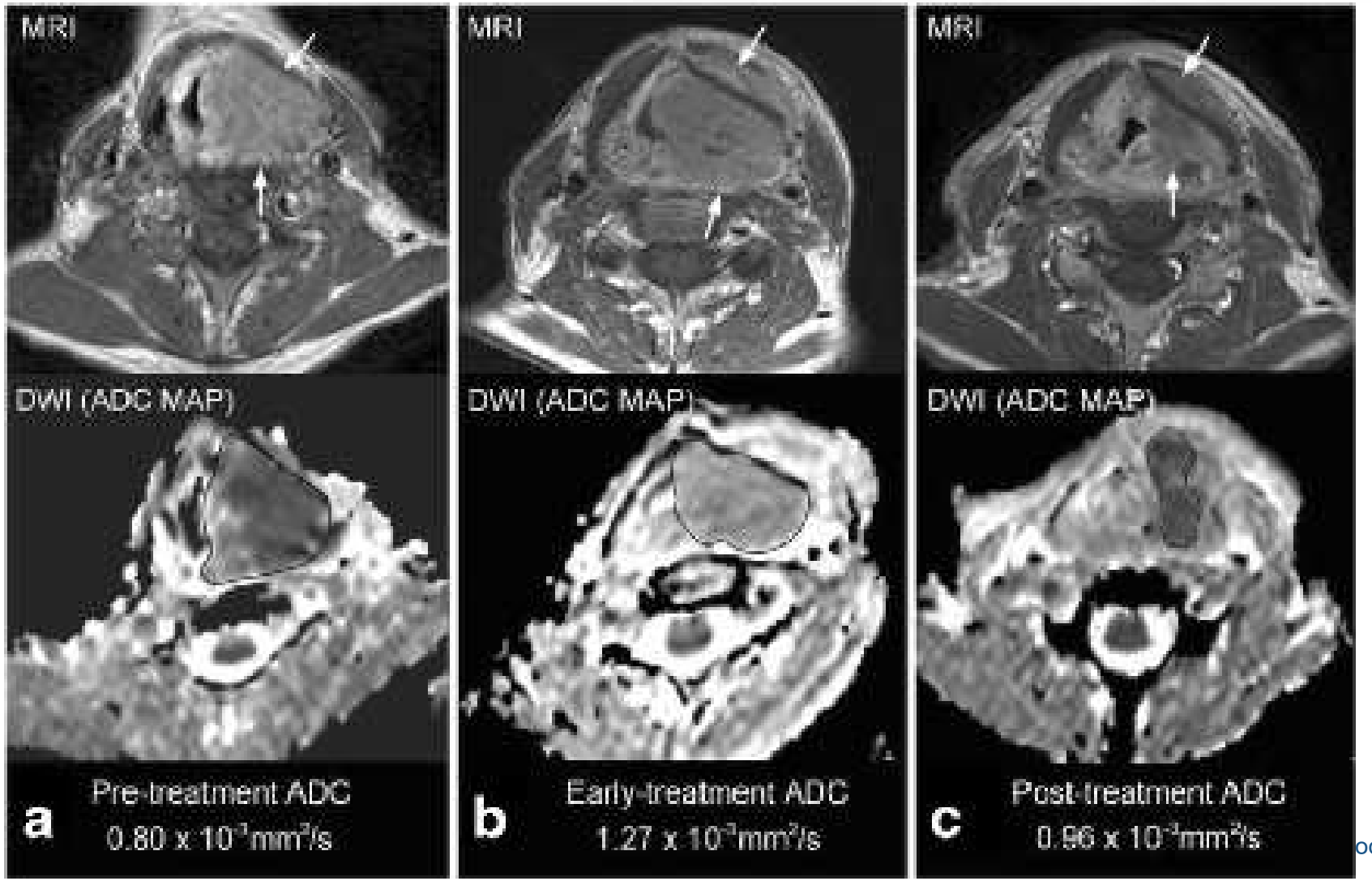
  - **Lésions post radiques**

- ADC faible
  - Hypercellularité
  - HPV 16 +

  Bon pronostic

  - **Récurrence tumorale**

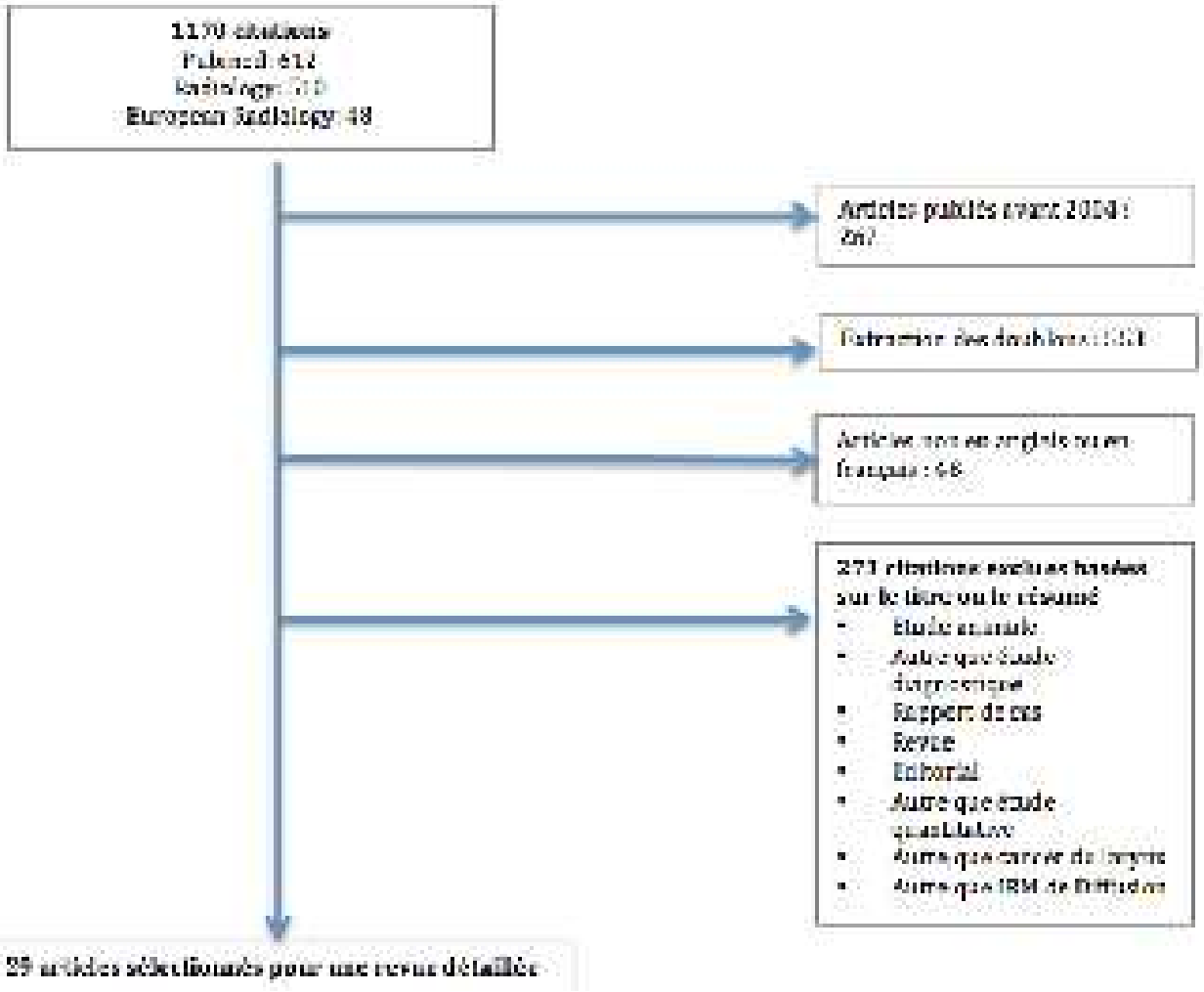
DWI



King A, Thoeny H, Cancer Imaging 2016

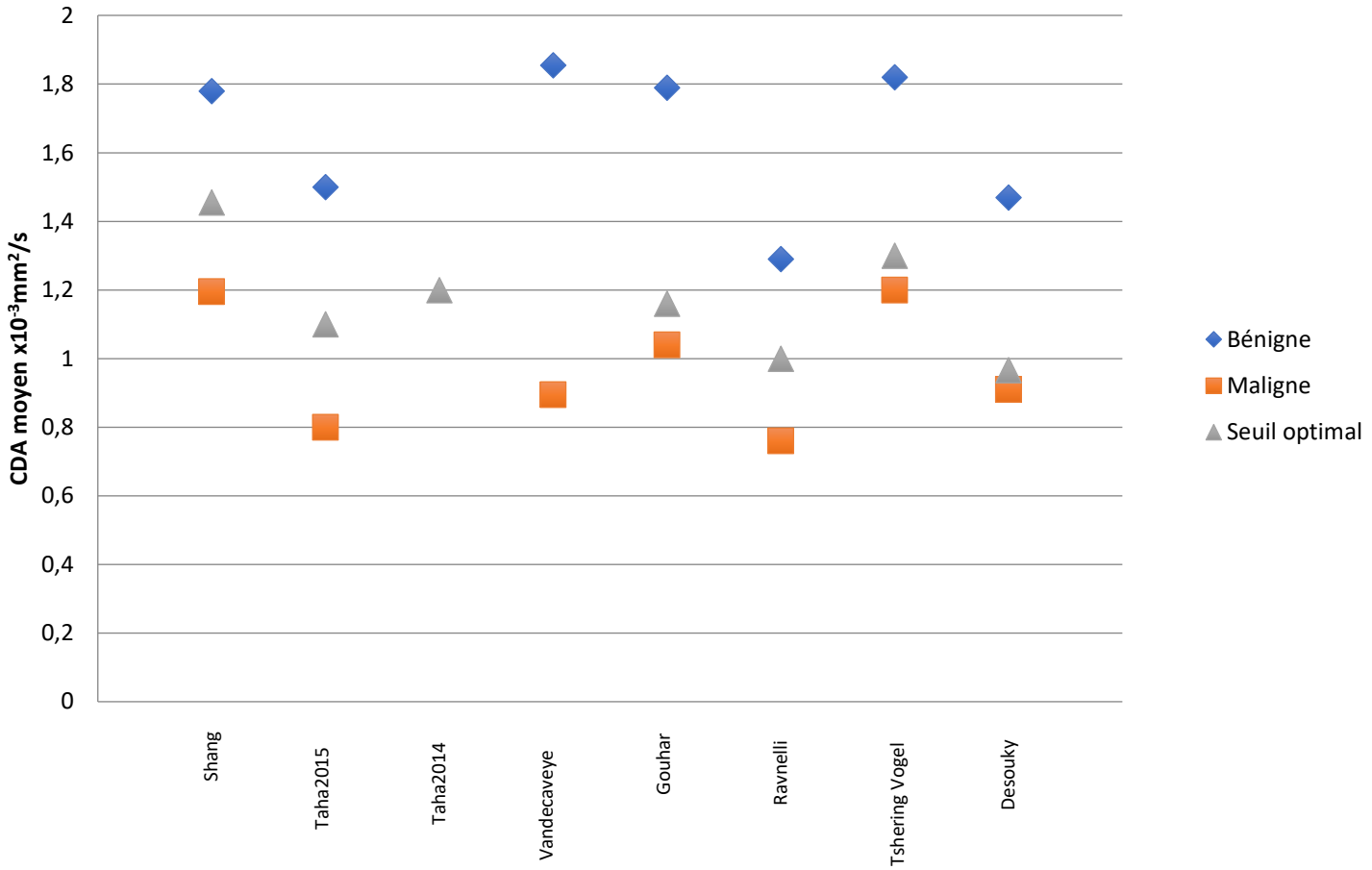
DWI

Coffre et al.

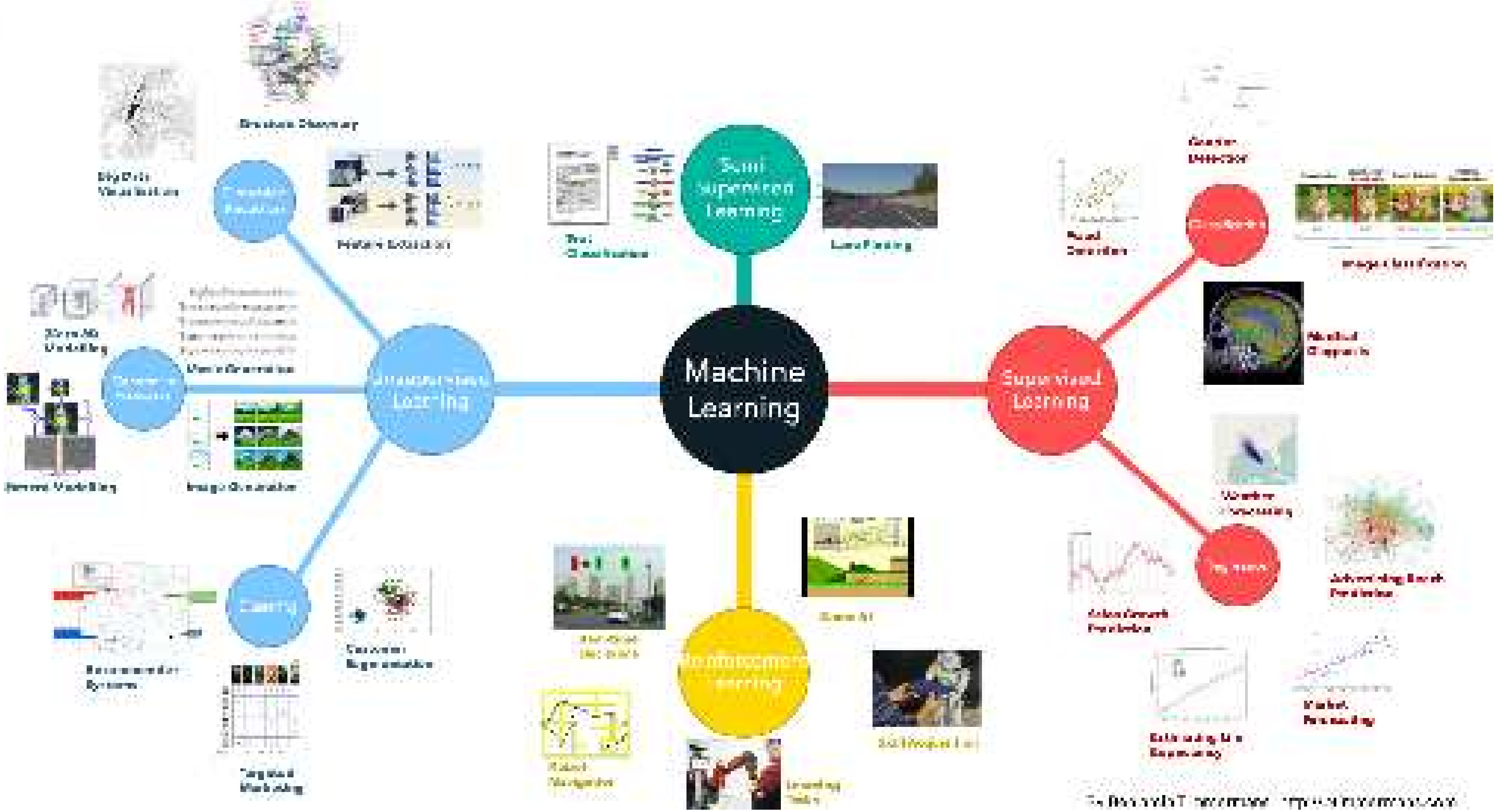


DWI

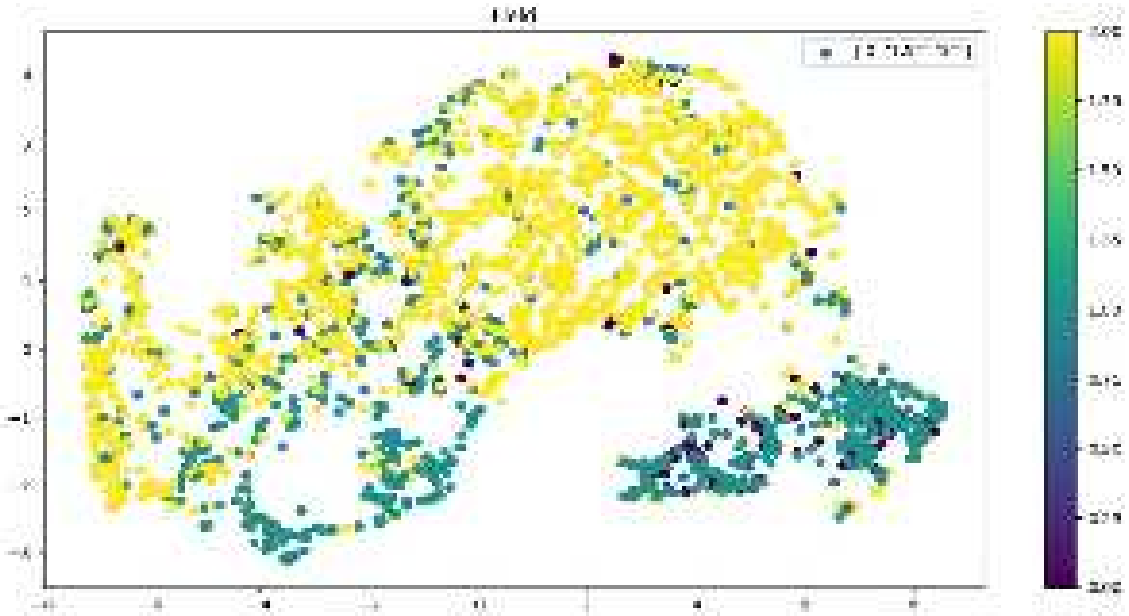
Coffre et al.

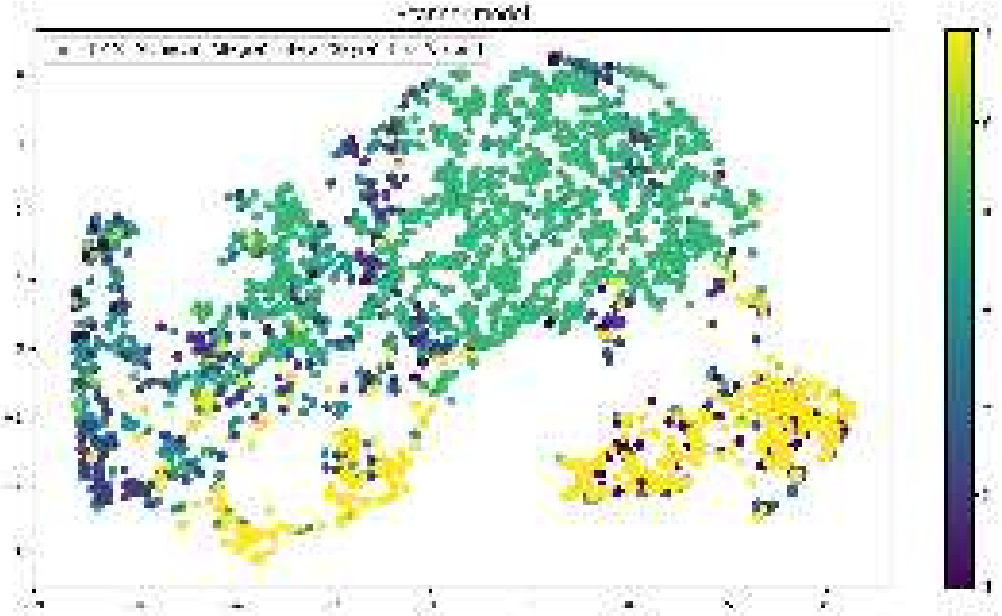


AI


Machine Learning
Supervised Learning
Semi Supervised Learning

AI





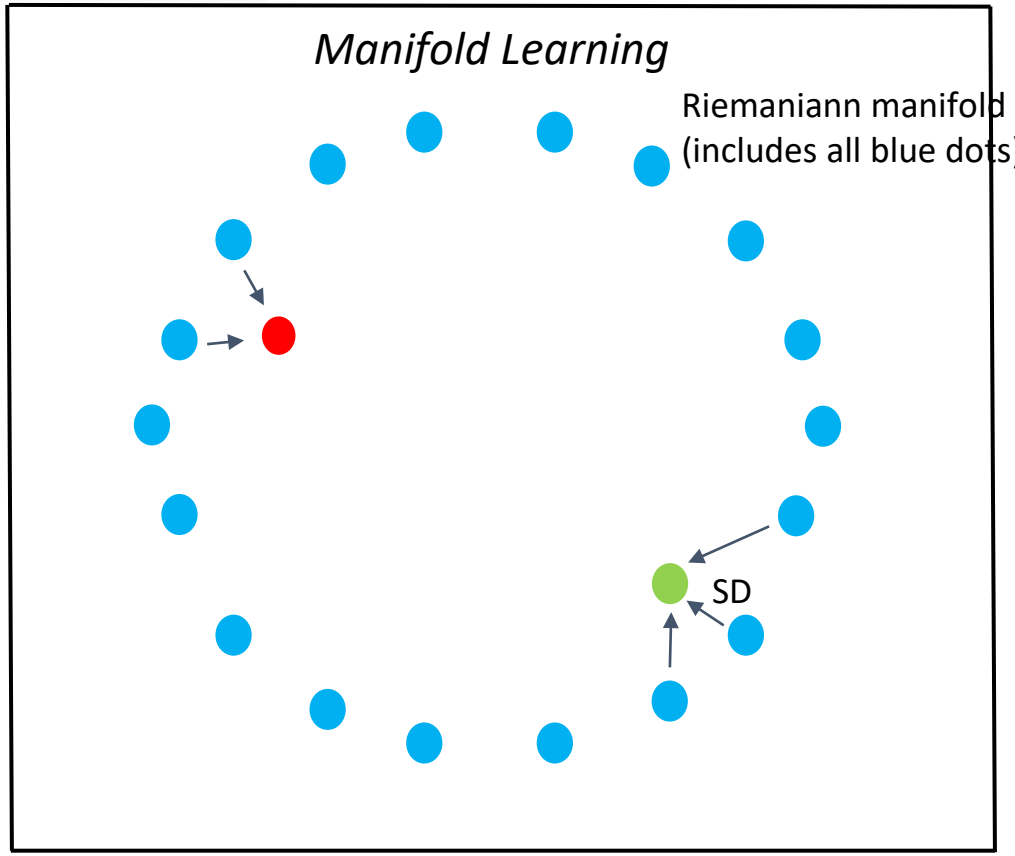
AI

SD: Standard deviation

Patient 1

Patient 2

Healthy controls



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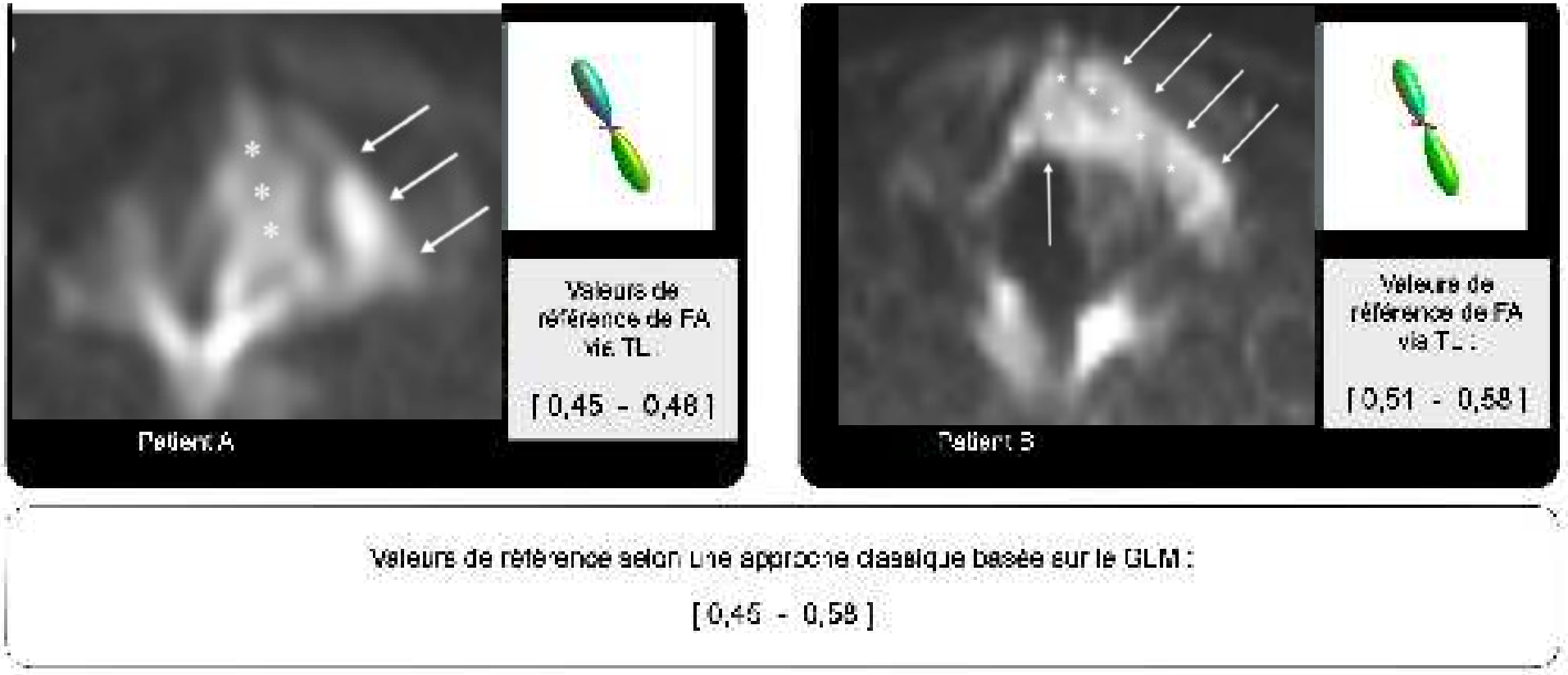
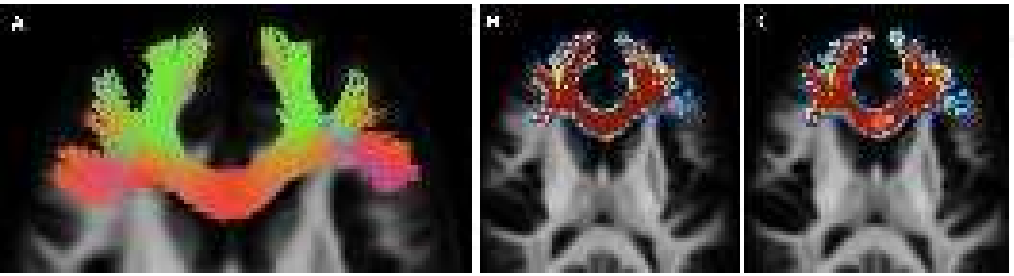

Valeurs de référence de FA via TL :
[0,45 - 0,48]
Patient A
Valeurs de référence de FA via TL :
[0,51 - 0,58]
Patient B
Valeurs de référence selon une approche classique basée sur le GLM :
[0,45 - 0,58]

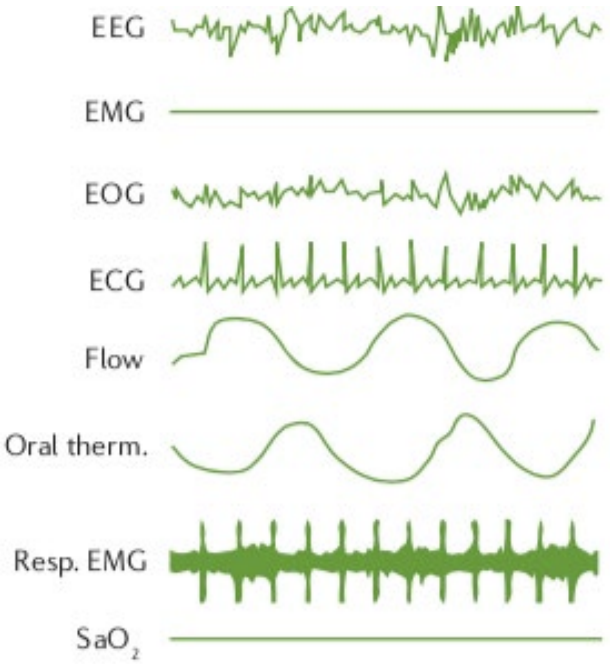
AI



DWI

Attyé et al, Neuroimage, 2021

PROTEOMICS



PHYSIOLOGY

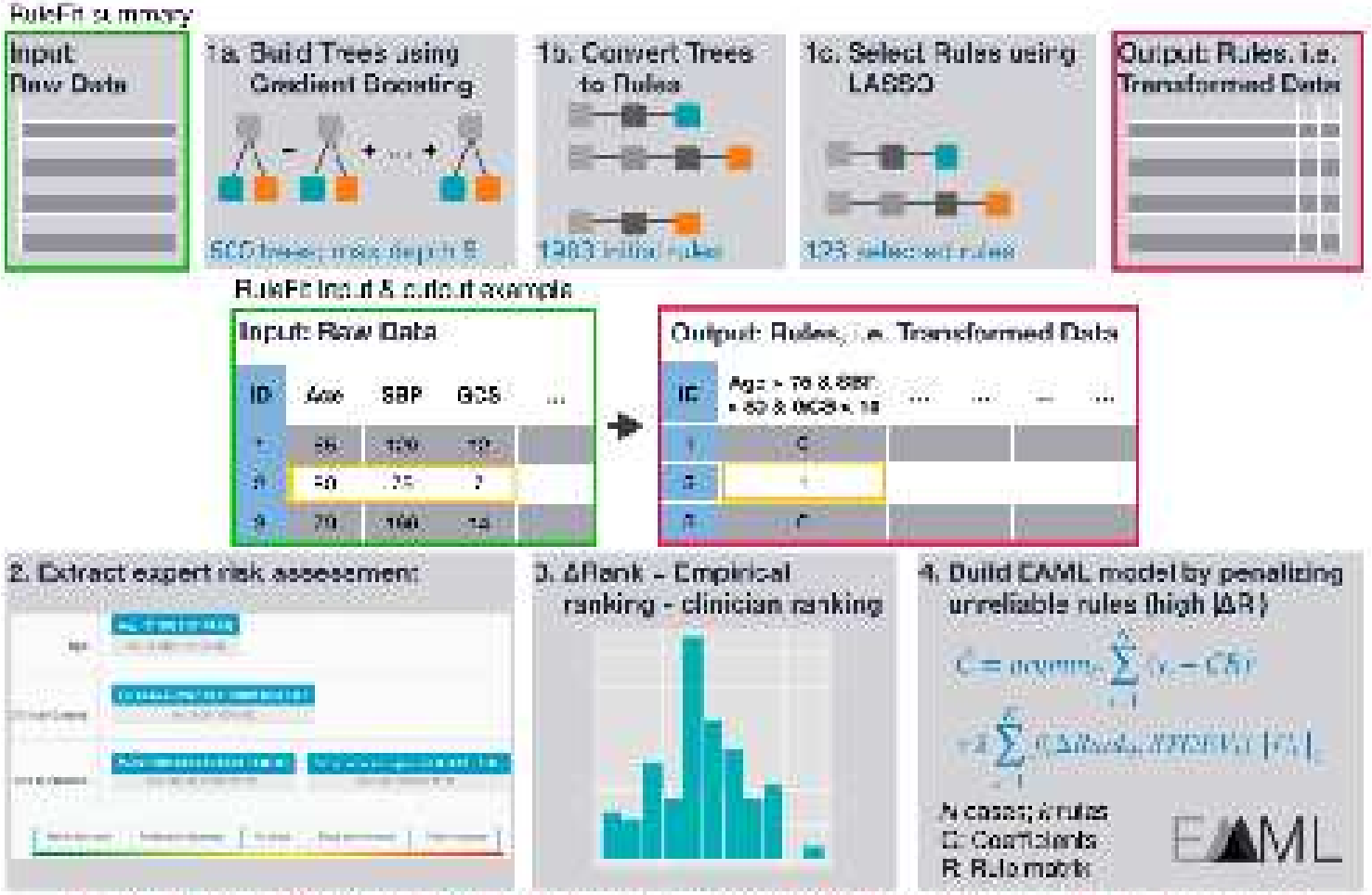
BIOLOGY

AI

RESEARCH ARTICLE

Expert-augmented machine learning

+ See all authors and affiliations



Conclusion

- IRM de Diffusion: très bon outil pour donner une information sur le grade tumoral et pour prédire la réponse thérapeutique en cancérologie des VADS
- Mais très peu pratiquée en soin courant
- Pas de modèle pronostic exportable /généralisable sans IA
- Analyse de variété: Algorithme le plus adapté à l'imagerie quantitative

Founders

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ICube - IMAGeS

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GeodAisics