



Clinical implementation and Site-specific workflow for free-breathing abdominal SBRT with 1.5T MR-Linac

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N. Sfameni - Radiotherapy technologists (RTT)

*Department of Radiation Oncology
Hôpital Riviera-Chablais*

Introduction

Context

57% of cancers are located in soft tissues

- Elekta-Unity Brochure, 2020 ; Globocan 2018. <https://www.uicc.org/news/new-global-cancer-data-globocan-2018>

Abdominal targets are subject to respiration and internal movements during treatment

SBRT treatment with MR-guided has a superior soft tissues contrast compared to CBCT

Aims

Describe the implementation and initial experience of MR-guided radiotherapy

- For free breathing SBRT abdominal moving target
- Positioning and setup procedure
- Treatment delivery workflow
- Patient compliance
- Perspectives

CT simulation

CT simulation in a supine position with the arms above the head

Abdominal compression was performed using an in-house pressure belt

4DCT images acquisition



MR simulation

MR simulation

- Assessment
- Reproduce CT setup patient
- T1 and T2
- Sagittal and coronal Cine-MRI acquisition

ITV approach using 4DCT



Clinical sites

Patients with liver, adrenals and pancreatic cancers were treated with SBRT in 5 fractions

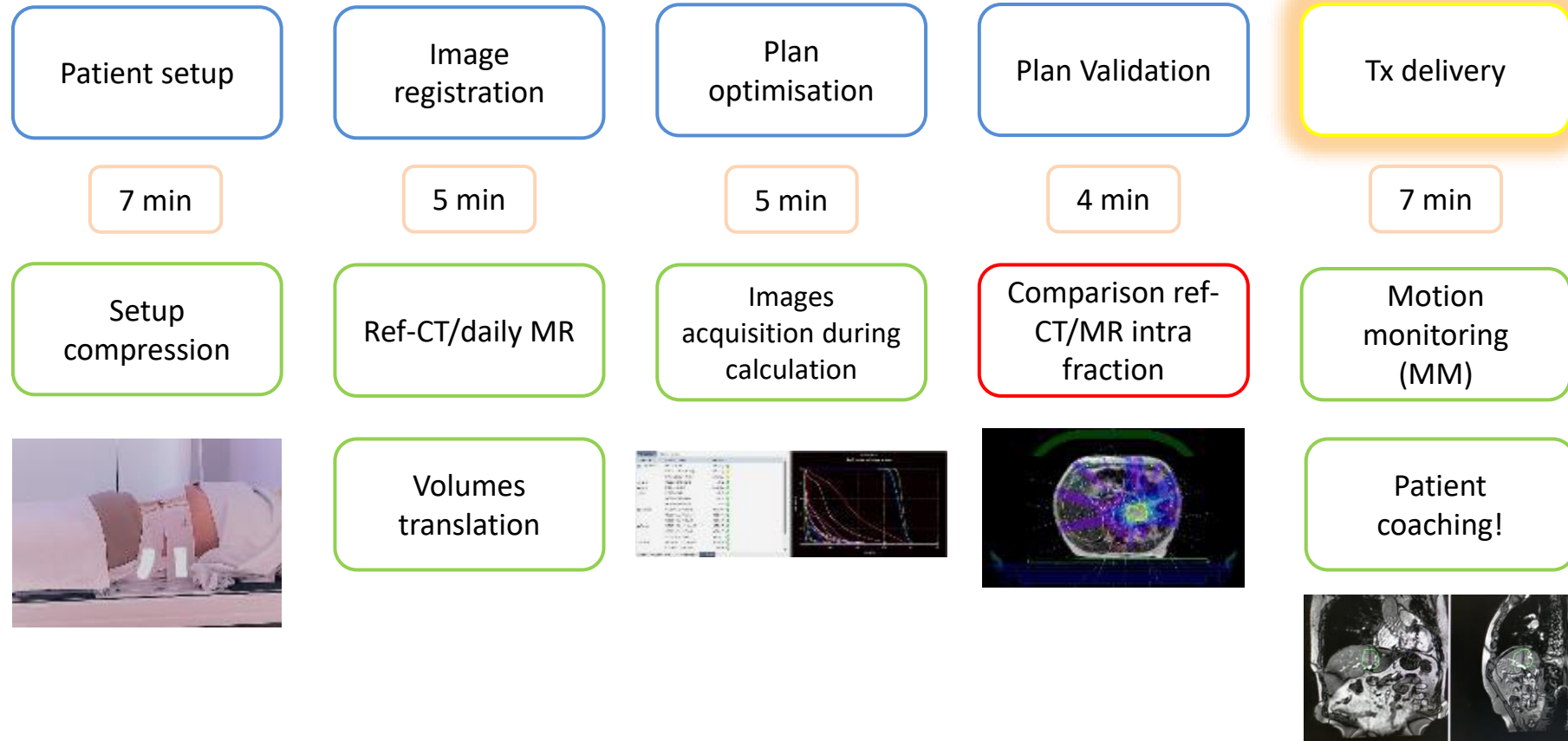
Patients were carry out with the Adapt-to-Position (ATP) workflow

- Volume translations with no anatomical changes

Patients were treated with the Adapt-to-Shape (ATS)

- Anatomical changes (Dimensions, shape...)
- Biological changes (Tumour response...)
- External shape of patient due to weight loss

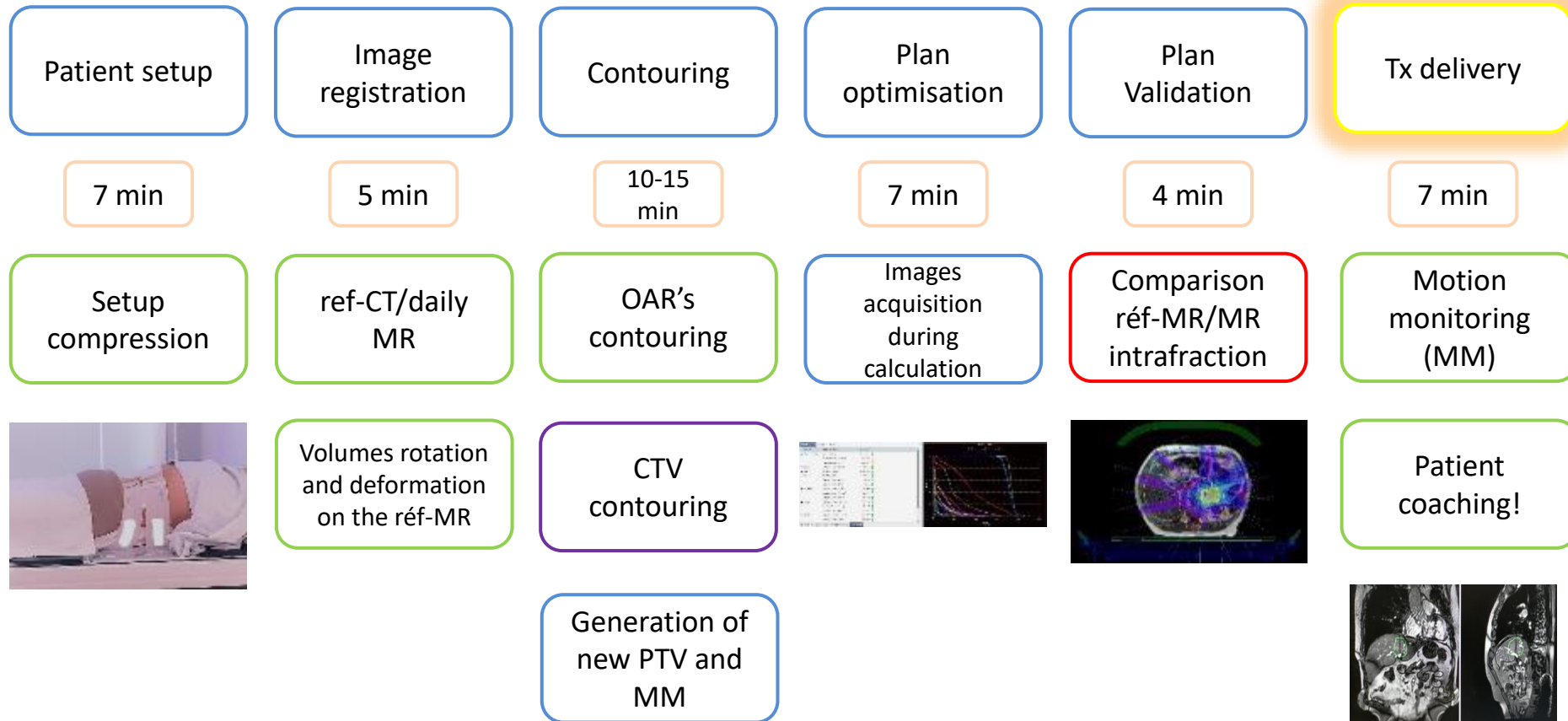
Online adaptative SBRT process : ATP



RTT

Physician
and physicist

Online adaptative SBRT process : ATS

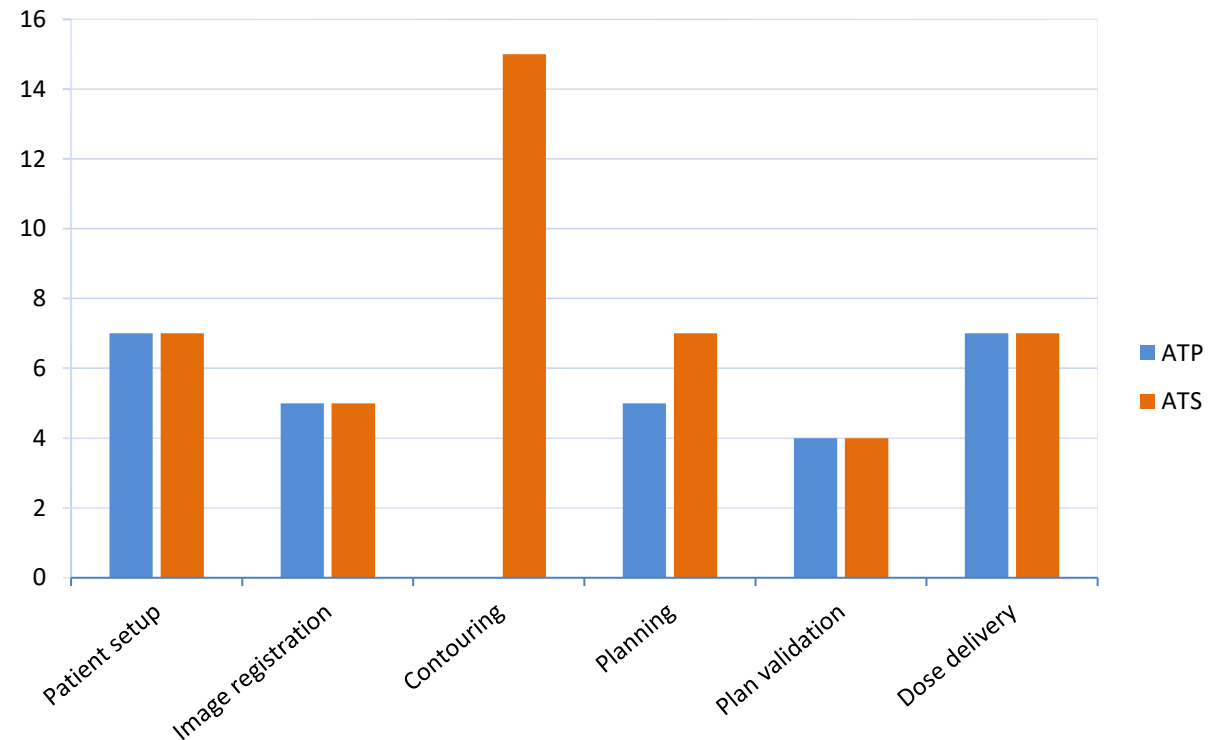


RTT

Physician

Physician and physicist

ATP versus ATS

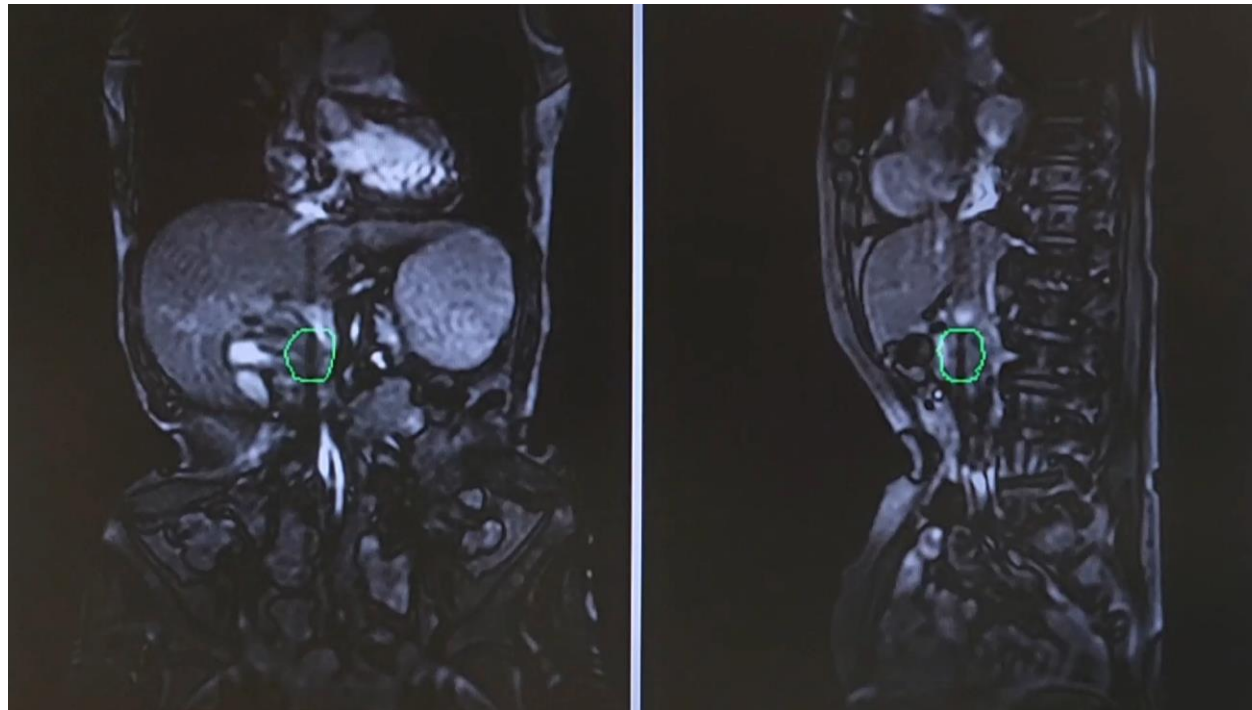


ATP: total time 28 minutes
ATS: total time 45 minutes

Focus treatment delivery

Visual guidance of the live sagittal and coronal Cine-MRI

- *Stop manually if the PTV is outside of the green envelop*



Focus treatment delivery

Audio feed-back when it's necessary to reproduce a manual gated delivery



Patient compliance

Assessment using a in-house developed questionnaire to document their treatment experience and tolerance

Questionnaire de satisfaction

Notre unité de radiocorrection protonique vous offre un traitement en une prise en charge de qualité optimale. Pour cela, votre avis est essentiel afin de s'assurer que nos objectifs sont atteints et les améliorer si besoin.

Pour nous aider dans cette démarche, nous vous proposons d'accomplir quelques minutes pour répondre à ce questionnaire (partiel/total).

	1	2	3	4	5	Non répondu
1. Le positionnement était confortable						
2. La durée du traitement était confortable						
3. L'attente de la consultation pendant le traitement était facile						
4. Le traitement était en accord avec vos attentes						
5. Le bruit était supportable						
6. L'attente avant d'informations avant le traitement						
7. La durée de la séance était supportable						
8. Le traitement dans la salle est adapté						
9. Le bruit pendant la séance						
10. L'attente de la séance						
11. La consultation était adaptée						
12. L'attente des consultations						
13. L'attente en salle d'attente						
14. L'attente avant de commencer le traitement						
15. L'attente avant de commencer la séance						
16. L'attente avant de commencer le traitement						
17. L'attente avant de commencer la séance						
18. L'attente avant de commencer le traitement						
19. L'attente avant de commencer la séance						
20. L'attente avant de commencer le traitement						

Two patients reported some MR-related complaints

- Uncomfortable position
- Long treatment session

Conclusion

The Elekta Unity MR-Linac enables a direct visualization of target motion during treatment delivery allowing safe SBRT free breathing treatment

Beginning 2023, automatic gating technology released by Elekta will be implemented in our department

Work in progress to develop new treatment indications on the Unity MR-Linac

Thank you!



Questions?

References

[1] Elekta-Unity Brochure, 2020 ; Globocan 2018. <https://www.uicc.org/news/new-global-cancer-data-globocan-2018>