World Journal of Urology (2019) 37:219–220
https://doi.org/10.1007/s00345-019-02659-0

EDITORIAL

# MRI-targeted biopsies: What's next?

**Guillaume Ploussard[1,2] · Alberto Briganti[3]**

Published online: 2 February 2019


The two last years have witnessed the confirmed advent of MRI and MRI-targeted biopsies in routine prostate cancer management thanks to the publication of a high level of evidence trials. MRI does better than TRUS biopsies in ruling out clinically significant disease (PROMIS trial), and MRI followed by targeted biopsies alone improves its detection (PRECISION trial) as compared with systematic biopsies [1, 2]. The question is no longer whether we should use MRI before biopsy and target the lesion if positive, but how this new information that implements our reflection on daily practice influences our treatment decision-making process.

Should we trust only targeted biopsies and definitively abandon systematic biopsies?

Should we doubt the negativity of MRI and targeted biopsies and go for an extra-target set of biopsies? Should we all rely on MRI regardless of the radiological expertise of a given centre?

Should we re-build our nomograms and prediction models by incorporating the targeted biopsies' pathological features, especially in active surveillance or focal therapy protocols?

Should we push for more precise targeted biopsies using dedicated softwares, using new biopsy approaches to improve the risk stratification and individualize the treatment strategy?

Unfortunately, not all these questions have been answered yet. In the present Topic of the World Journal of Urology entitled "*MRI-targeted biopsies for prostate cancer diagnosis and management*", the authors managed to deal with these clinical uncertainties by sharing their centre's experience or by assessing the current literature.

✉ Guillaume Ploussard
g.ploussard@gmail.com

[1] Department of Urology, La Croix du Sud Hospital, 52, chemin de Ribaute, 31130 Quint-Fonsegrives, France

[2] Department of Urology, Institut Universitaire du Cancer Toulouse - Oncopole (IUCT-O), Toulouse, France

[3] Department of Urology, San Raffaele Hospital, Milan, Italy

In the comprehensive review written by the European Association of Urology Young Academic Urologists Prostate Cancer Working Party, the importance of systematic biopsies has been highlighted [3]. The combination of both targeted and systematic biopsies improved the overall and significant (about 10%) prostate cancer detection rates as compared with a pure targeted strategy. The MRI-FIRST trial recently confirmed that a pure targeted biopsy strategy led to a not negligible risk of missing significant cancer symptoms, due to limitations of multiparametric MRI performance/reading and of precision during lesion targeting [4]. The physician facing a patient with a positive MRI should use the most accurate strategy to rule out/detect significant foci. So, systematic biopsies are not over, but till when? Technical issues as well as operator errors still exist in the targeted biopsy strategy leading to concerns of missing the disease, especially in case of negative targeted biopsies with MRI-visible lesions. Gold et al. [5] have reviewed all potential sources of error which can arise from each step of the process: false positive lesions in MRI, acquisition errors, fusion pitfalls, anatomic limits of needle placement, etc. New advances in technology will probably correct these sources of mistargeting, however, their widespread use will depend on the costs. To date, the vast majority of urologists do not use a dedicated fusion system when performing targeted cores, but cognitively target the lesion. Does it really matter? Marra et al. [6] emphasized that the strategy should be tailored to local expertise and resources availability. Software-based fusion biopsies probably improve the precision of targeting, in terms of millimeters but not in terms of detection rate [7, 8]. Another way of improvement might be the biopsy route. Indeed, especially for anterior and apical lesions, transperineal biopsies can lead to a not negligible rate of re-stratification by providing more cancer material for pathology [9]. This refinement of risk stratification (towards higher risk groups) meaningfully influences the treatment choice with more curative intent strategies due to a re-evaluation of cancer grade.

The management of presumed low-risk prostate cancer has also evolved from radical to focal therapy and active

surveillance due to the visualization of significant lesions in MRI and the predictive value of imaging in the negative part of the gland. Through a single-centre report of patients treated by high-intensity focused ultrasound hemiablation, Dr Villers and his team showed that pathologically insignificant, MRI-negative, extra-target disease did not influence the follow-up course and did not have an impact on the radical treatment-free survival [10]. In active surveillance protocols, the strong negative value of MRI could also avoid the use of confirmatory biopsies in case of negative MRI at entry, and thereby improve patient's heath-related quality of life while avoiding biopsy complications [11].

The other benefit from targeted biopsies that has not yet been thoroughly evaluated is the improvement of the prognosis assessment. To date, the vast majority of prognostic tools used in clinical practice for treatment decision-making are based on systematic biopsies, in addition with clinico-biological parameters combined or not with imaging. An emerging literature tends to demonstrate that the incorporation of targeted biopsy features in this assessment clearly improves it [12]. The perfect proof is the recent update of the Briganti nomogram for predicting lymph node invasion and planning lymph node dissection during radical prostatectomy in which the incorporation of grade group on targeted biopsy has improved the overall performance of the statistical model [13].

The MRI-targeted biopsies have now invaded our clinical practice. We must now ask ourselves how to use them optimally, to improve diagnosis, reduce the risks of misclassification, more accurately assess prognosis, and individualize patient care strategies.

## References


1. Kasivisvanathan V, Rannikko AS, Borghi M et al (2018) MRI-targeted or standard biopsy for prostate-cancer diagnosis. N Engl J Med 378:1767–1777
2. Ahmed HU, El-Shater Bosaily A, Brown LC et al (2017) Diagnostic accuracy of multi-parametric MRI and TRUS biopsy in prostate cancer (PROMIS): a paired validating confirmatory study. Lancet 389:815–822
3. Ploussard G, Borgmann H, Briganti A et al (2018) Positive pre-biopsy MRI: are systematic biopsies still useful in addition to targeted biopsies? World J Urol. https://doi.org/10.1007/s00345-018-2399-z
4. Rouvière O, Puech P, Renard-Penna R et al (2019) Use of prostate systematic and targeted biopsy on the basis of multiparametric MRI in biopsy-naive patients (MRI-FIRST): a prospective, multicentre, paired diagnostic study. Lancet Oncol 20:100–109
5. Gold SA, Hale GR, Bloom JB et al (2018) Follow-up of negative MRI-targeted prostate biopsies: when are we missing cancer? World J Urol. https://doi.org/10.1007/s00345-018-2337-0
6. Marra G, Ploussard G, Futterer J et al (2019) Controversies in MR targeted biopsy: alone or combined, cognitive versus software-based fusion, transrectal versus transperineal approach? World J Urol. https://doi.org/10.1007/s00345-018-02622-5
7. Cornud F, Roumiguié M, Barry de Longchamps N et al (2018) Precision Matters in MR imaging-targeted prostate biopsies: evidence from a prospective study of cognitive and elastic fusion registration transrectal biopsies. Radiology 287:534–554
8. Wysock JS, Rosenkrantz AB, Huang WC et al (2014) A prospective, blinded comparison of magnetic resonance (MR) imaging-ultrasound fusion and visual estimation in the performance of MR-targeted prostate biopsy: the PROFUS trial. Eur Urol 66:343–351
9. Covin B, Roumiguié M, Quintyn-Ranty ML et al (2018) Refining the risk-stratification of transrectal biopsy-detected prostate cancer by elastic fusion registration transperineal biopsies. World J Urol. https://doi.org/10.1007/s00345-018-2459-4
10. Annoot A, Olivier J, Valtille P et al (2018) Extra-target low-risk prostate cancer: implications for focal high-intensity focused ultrasound of clinically significant prostate cancer. World J Urol. https://doi.org/10.1007/s00345-018-2442-0
11. Olivier J, Kasivisvanathan V, Drumez E et al (2018) Low-risk prostate cancer selected for active surveillance with negative MRI at entry: can repeat biopsies at 1 year be avoided? A pilot study. World J Urol. https://doi.org/10.1007/s00345-018-2420-6
12. Dell'Oglio P, Stabile A, Dias BH et al (2018) Impact of multiparametric MRI and MRI-targeted biopsy on pre-therapeutic risk assessment in prostate cancer patients candidate for radical prostatectomy. World J Urol. https://doi.org/10.1007/s00345-018-2360-1
13. Gandaglia G, Ploussard G, Valerio M et al (2018) A novel nomogram to identify candidates for extended pelvic lymph node dissection among patients with clinically localized prostate cancer diagnosed with magnetic resonance imaging-targeted and systematic biopsies. Eur Urol 5:64. https://doi.org/10.1016/j.eururo.2018.10.012