Poster #HTA40

Living Network Meta-analysis for Up-to-date Comparative Effectiveness: A Case Study in Metastatic Castration-resistant Prostate Cancer

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Background

- The volume and speed of publications reporting new relevant evidence can lead to health technology assessment (HTA) decisions being informed by out-of-date evidence.
- The concept of a living HTA, which ensures a pre-defined commitment to regular updates, is increasingly being explored.[1]
- Network meta-analyses (NMA) are integral to HTAs. The traditional NMA methods for synthesizing comparative clinical evidence are time-consuming, requiring extensive data preparation and knowledge of statistical programming.
- A living NMA tool presents an opportunity to recreate existing NMAs, monitor new evidence, and update analyses in minutes.
- In 2022, 102 abstracts on interventions for metastatic castration-resistant prostate cancer (mCRPC) were recorded in our congress abstracts publication tracking platform (LiveRef®). This reflects the rapidly shifting evidence landscape, which requires a nimble analytic approach that is easier and quicker to update.

Objective

- The aim of this study was to replicate and update a previously published NMA using LiveNMA™, a new, interactive tool linked to LiveSLR®, an interactive, up-to-date systematic literature review (SLR) library.

Methods

- An integrated living NMA tool was developed, leveraging an existing living SLR platform (LiveSLR®), which is regularly updated to capture newly published articles and abstracts.
- LiveNMA™ is an R-based tool that performs Bayesian NMAs for overall survival (OS) and progression-free survival using studies identified by LiveSLR®.
- To validate this tool, a previously published NMA[2] of OS among patients with mCRPC who progressed after docetaxel regimens was replicated.
- Chen et al, 2022[2] conducted their NMA using the Bayesian framework, utilizing the gemtc and rjags packages within the R program.
- The network consisted of five trials[3-7] (Table 1) and four treatments.
- The analysis was updated using the LiveNMA™ tool with data from a recently published study[8] identified through LiveSLR®, comparing a prostate-specific membrane antigen-based radioligand therapy with best supportive care.
- LiveNMA™ analysis is based on the Bayesian approach, with a default Markov Chain Monte Carlo setting of 10,000 iterations. Analysis was done using the fixed-effect model.

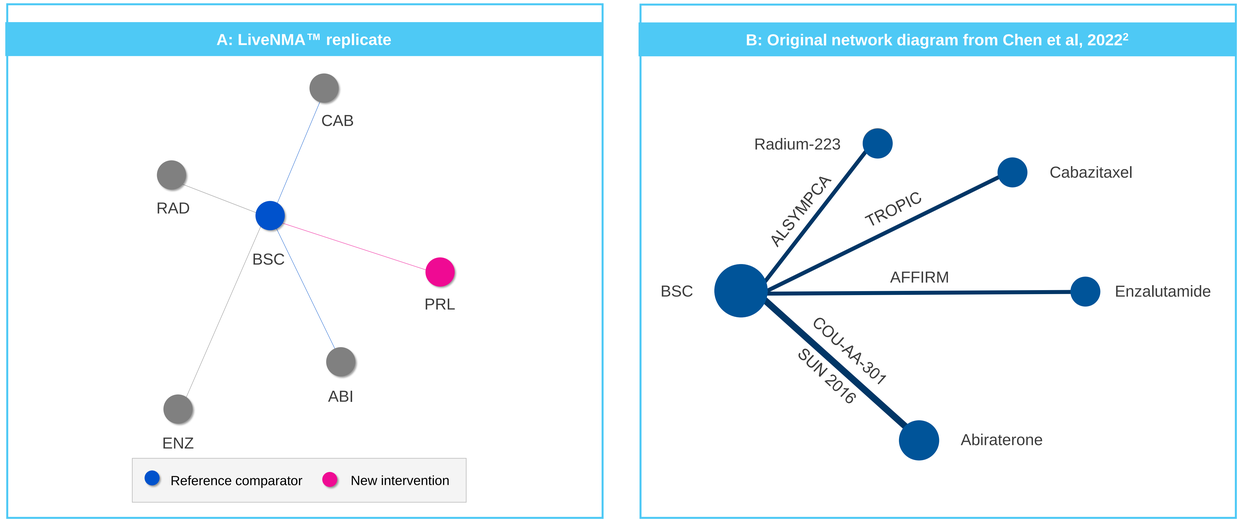
Table 1. Included studies

Reference	Trial name	Interventions
de Bono et al., 2010[3]	TROPIC	Cabazitaxel vs mitoxantrone
Parker et al., 2013[4]	ALSYMPCA	Radium-223 vs placebo
Fizazi et al., 2012[5]	COU-AA-301	Abiraterone vs placebo
Sun et al., 2016[6]	NCT01695135	Abiraterone vs placebo
Scher et al., 2012[7]	AFFIRM	Enzalutamide vs placebo
Sartor et al. 2021[8]	**VISION**	**177Lu-PSMA-617 vs best supportive/best standard of care**

Notes: Pink shaded row indicates a newly added study. All studies are phase 3 randomized controlled trials; original SLR reclassified all comparators as best supportive care.
Abbreviations: PSMA, prostate-specific membrane antigen

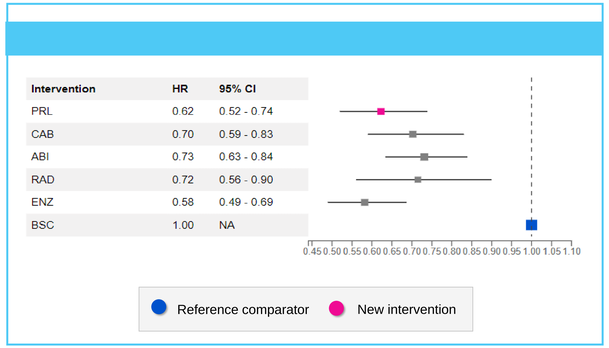
Results

Figure 1. Network diagrams



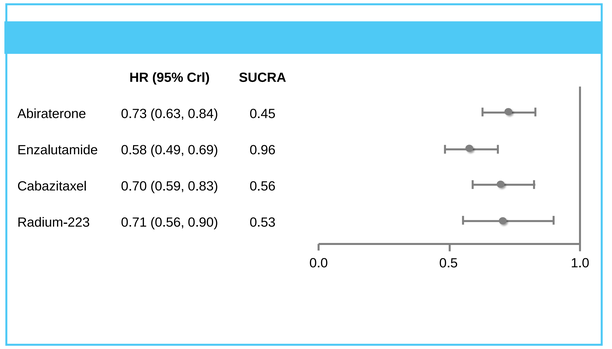
Source: (figure B on right) recreated based on Figure 2 from Chen et al, 2022[2]
Abbreviations: ABI, abiraterone; BSC, best supportive care; CAB, cabazitaxel; ENZ, enzalutamide; PRL, prostate-specific membrane antigen-directed radioligand therapy; RAD, radium-223

Figure 2. Replicated forest plot of OS hazard ratios



Abbreviations: ABI, abiraterone; BSC, best supportive care; CAB, cabazitaxel; CI, confidence interval; ENZ, enzalutamide; HR, hazard ratio; NA, not applicable; PRL, prostate-specific membrane antigen-directed radioligand therapy; RAD, radium-223

Figure 3. Original forest plot from Chen et al[2]



Source: Recreated based on Figure 3A from Chen et al, 2022[2]
Abbreviations: CrI, credible interval; HR, hazard ratio, SUCRA, surface under the cumulative ranking

- The LiveNMA™ software tool and the LiveSLR® platform were combined to replicate the reference network diagram (Figure 1) and treatment hierarchy (Figure 2 and Figure 3).
- The process, from configuration via the user interface to the generation of the output, was implemented within two minutes.
- Both networks were structurally similar and treatment ranking was comparable.

Limitations

- The results should be interpreted with caution because the tool is not currently equipped to assess heterogeneity in baseline characteristics and trial designs.
- While treatment comparison against a reference intervention is possible, comparison between treatments in a matrix (pairwise) format cannot yet be implemented.

Conclusion

- This study demonstrated the utility of the interactive LiveNMA™ tool, which replicated and updated an existing NMA analysis in just a few minutes.
- This easy and reliable tool can help decision-makers stay current with comparative effectiveness of new and existing treatments.

References

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