Document Version
Early version, also known as pre-print

Link to publication record in King's Research Portal

Citation for published version (APA):
Peek, M., Ahmed, M., Napoli, A., ten Haken, B., McWilliams, S., Usiskin, S. I., ... Douek, M. High Intensity Focused Ultrasound (HIFU) ablation in the treatment of breast cancer: A systematic review

Citing this paper
Please note that where the full-text provided on King's Research Portal is the Author Accepted Manuscript or Post-Print version this may differ from the final Published version. If citing, it is advised that you check and use the publisher's definitive version for pagination, volume/issue, and date of publication details. And where the final published version is provided on the Research Portal, if citing you are again advised to check the publisher's website for any subsequent corrections.

General rights
Copyright and moral rights for the publications made accessible in the Research Portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognize and abide by the legal requirements associated with these rights.

• Users may download and print one copy of any publication from the Research Portal for the purpose of private study or research.
• You may not further distribute the material or use it for any profit-making activity or commercial gain
• You may freely distribute the URL identifying the publication in the Research Portal

Take down policy
If you believe that this document breaches copyright please contact librarypure@kcl.ac.uk providing details, and we will remove access to the work immediately and investigate your claim.
High Intensity Focused Ultrasound (HIFU) ablation in the treatment of breast cancer: A systematic review

Mirjam C L Peek, BSc, 1 2 Muneer Ahmed, MD, 1 Alessandro Napoli, MD, PhD, 3 Bennie ten Haken, Dr, Ir, 1 Sarah McWilliams, MD, 1 Sasha I Usiskin, MD, 4 Sarah E Pinder, Prof, 1 Miek van Hemelrijck, PhD, 5 Michael Douek, MD. 1

1 Department of Research Oncology, Division of Cancer Studies, King’s College London, Guy’s Hospital Campus, Great Maze Pond, London SE1 9RT, Great Britain. 
2 Institute for Biomedical Technology and Technical Medicine, University of Twente, 7500AE Enschede, The Netherlands. 
3 Department of Radiological Sciences, Sapienza University of Rome, School of Medicine, Piazzale Aldo Moro 5, 00185 Rome, Italy. 
4 Department of Radiology, St Bartholomew’s Hospital, West Smithfield, London EC1A 7BE, Great Britain. 
5 Cancer Epidemiology Group, Division of Cancer Studies, King’s College London, Guy’s Hospital Campus, Great Maze Pond, London SE1 9RT, Great Britain.

RESULTS

Two studies showed a good correlation between the increase in signal intensity (r = 0.897 and r = 0.749), maximum difference function (r = 0.789), positive enhancement integral (r = 0.859 and r = 0.778) and the percentage of residual tumour. In one study the imaging results were compared to the histopathology, true negative results were found in 95% (18/19 patients) and true positive results were found in 60% (3/5 patients).

Assessment of response to HIFU using histopathology (figure 3)

The weighted summary proportion analysis showed an estimated proportion of 30% (95% CI: 0.18 - 0.43) of patients having no residual disease after HIFU treatment. In core needle studies 90% (43/48 patients) of patients had no residual disease.

Post-treatment complications (figure 4) and cosmesis (figure 5)

The general findings are shown in figure 2. A clear reduction in tumour size is visible and no further treatment is required.

Recurrent: Recurrence of the tumour was found in two patients (1% total, 7% of patients with follow-up).

For additional information please contact:
Mirjam Peek
	mirjam.1.peek@kcl.ac.uk

Acknowledgement: We would like to thank Theracision Ltd (Malakoff, France) for an educational grant to fund our research work.

CONCLUSION

HIFU has been shown to successfully induce coagulative necrosis in breast tumours. Complete ablation has not been consistently reported. Large, prospective trials to demonstrate consistent tumour and margin necrosis (sonological safety) with reliable follow-up imaging are required before HIFU can be used outside of clinical trials.