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Systematic literature review on PAI and needle positioning errors

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Jette Bloemberg[1]

[1]Delft University of Technology

Jette Bloemberg
Delft University of Technology

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We use this protocol and it's working

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Abstract

This protocol aims to ensure the reproducibility of the systematic literature review carried out on the quantification of and current guidelines on the hazards related to needle positioning in prostate cancer treatment: (1) access restrictions to the prostate gland by the pubic arch, so-called Pubic Arch Interference (PAI) and (2) needle positioning errors.

Literature search method

1 **Databases**: Embase, Medline ALL, Web of Science Core Collection*, and Cochrane Central Register of Controlled Trials databases
The search keywords: (a) therapy (e.g., brachytherapy, ablation therapy, laser ablation), (b) target (e.g., prostate, prostate tumor), and (c) needles and challenges or hazards (e.g., needle, catheter, probe, pubic).
Complete search term: (brachytherapy/exp OR 'brachytherapy device'/de OR 'ablation therapy'/exp OR 'ablation device'/exp OR 'microwave thermotherapy'/de OR 'laser thermotherapy'/de OR electroporation/de OR 'electroporation system'/de OR 'photodynamic therapy'/de OR 'photodynamic therapy device'/de OR cryosurgery/de OR cryotherapy/de OR cryoablation/de OR 'salvage therapy'/de OR (brachytherap* OR brachy-therap* OR ((interstitial* OR internal*) NEAR/3 (radiat* OR radio-therap*)) OR ((radioisotope* OR radium*) NEAR/3 therap*) OR ablation* OR cryoablation* OR ((microwave* OR micro-wave* OR laser* OR radiofrequency OR radio-frequency) NEAR/3 (thermotherap* OR thermos-therap* OR ablat*)) OR (laser NEAR/3 interstitial*) OR electroporat* OR ((photodynamic* OR photo-dynamic*) NEAR/3 therap*) OR cryosurg* OR cryo-surg* OR cryotherap* OR cryo-therap* OR cryoblat* OR cryo-ablat* OR ((focal) NEAR/3 therap*)):ab,ti) AND ('prostate tumor'/exp OR prostate/exp OR (prostat*):Ab,ti) AND ((((needle/exp NOT 'biopsy needle'/exp) OR catheter/exp OR 'surgical probe'/de OR cannula/exp OR devices/de OR implant/exp OR obturator/de) AND ('movement (physiology)'/de OR position/de OR error/exp OR accuracy/de)) OR 'pubic bone'/de OR edema/exp OR ('organ size'/de AND prostate/de) OR 'prostate volume'/de OR 'therapeutic error'/de OR 'measurement accuracy'/de OR (((needle* OR catheter* OR probe* OR cannula* OR Stylet* OR device* OR Instrument* OR implant* OR obturator* OR applicator*) NEAR/3 (movement* OR move* OR moving* OR displace* OR plac* OR shift* OR offset OR deform* OR non-parallel OR position* OR error* OR migrat* OR locat* OR lateral* OR inferior* OR side OR off-axis OR ventral* OR dorsal* OR medial* OR accura* OR precis* OR target* OR free-hand OR oblique OR geometr* OR motion*)) OR re-insert* OR repunct* OR readvance* OR reinsert* OR re-punct* OR re-advance* OR correct* OR misplace* OR mistreat* OR (pubic NEAR/3 (bone OR arch)) OR edema* OR oedema* OR (prostat* NEXT/1 (size OR volume*)) OR (large* NEXT/1 prostat*) OR ((cm3 OR cm-3 OR ml OR cc) NEAR/3 prostat*) OR ((therap* OR treat* OR position* OR plac*) NEAR/3 error*) OR (measurement* NEAR/3 accura*) OR ((volum* OR anatom* OR geometr*) NEAR/1 change*)):ab,ti) NOT (phantom/mj OR 'urethral catheter'/mj OR (prostatectom* OR benign* OR phantom* OR Transurethral* OR urethral*-catheter*):ti) NOT ([animals]/lim NOT [humans]/lim) AND [english]/lim NOT ([conference abstract]/lim AND [2000-2018]/py)

2 **Elibility criteria**
Screen title, abstract, and full text based on the following eligibility criteria:
- Only interventions were included with which prostate cancer can be treated locally via the transperineal pathway without resecting the prostate, excluding articles on diagnostics,

treatment of benign tumors, (partial) resection of the prostate, and prostate volume determination.
- Regarding the study conditions, only clinical studies were accepted, whereas pre-clinical, phantom, animal, and simulation studies were excluded.
- Only studies focused on the quantitative assessment of needle positioning were accepted, excluding studies solely focused on needle design, planning, patient selection, physician learning curve, automated needle detection, functional or biological outcomes, hospitalization time, and costs. Hazards unrelated to needle positioning were excluded, such as prostate movement due to bladder filling, brachytherapy seed migration, and inter-observer variability.

Results

3 **Quality assessment**

In order to assess the quality of the included studies, the following six parameters are used:
1. Representative cohort: Was the cohort of patients in the study representative of the patients who will receive the treatment in practice? (i.e., the patients were described in enough detail (e.g., Gleason score, age, prostate volume) that a clinician could recognize them as similar to those encountered in clinical practice)
2. Selection criteria: Were selection criteria for the cohort of patients included in the study clearly described? (i.e., including and exclusion criteria reported)
3. Method reproducibility: Have the authors described the method they used to measure the level of PAI or needle positioning error in enough detail so that it can be reproduced2?
4. Imaging modality: Was the imaging modality of the measurement(s) clearly described?
5. Patient position: Was the patient position during the measurement(s) clearly described?
6. Prospective: Is the study prospective?
The studies are scored on these parameters with “Yes”, “No”, or “Unclear”.

4 **Outcomes**

The following data of the included articles are extracted: a) author name and year of publication, b) treatment type, c) number of patients, d) imaging modality, e) patient position during imaging, f) prostate volume, g) PAI or needle positioning errors measured, and h) time between implantation and error measurement.