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Resources. Day 2

Prostate Cancer.
The following is a non-exhaustive bibliography of systematic reviews that are free to access, published years 2021-2024, on the field of Prostate Cancer.

1 Diagnostic Efficacy of [(99m)Tc]Tc-PSMA SPECT/CT for Prostate Cancer: a Meta-Analysis

Wang Q, Ketteler S, Bagheri S, Ebrahimifard A, Luster M, Librizzi D, Yousefi BH.BMC Cancer. 2024 Aug 8;24(1):982. doi: 10.1186/s12885-024-12734-4.PMID: 39118101.

Abstract

Background: Prompt and accurate diagnosis of prostate cancer (PCa) is of paramount importance for effective treatment planning. While Gallium-68 labeled prostate-specific membrane antigen (PSMA) positron emission tomography (PET)/computed tomography (CT) has proven efficacy in detecting PCa, limited availability poses challenges. As a potential alternative, [99mTc]Tc-PSMA single photon emission computed tomography (SPECT)/computed tomography (CT) holds promise. This systematic review and meta-analysis aimed to evaluate the diagnostic value of [99mTc]Tc-PSMA SPECT/CT for prostate cancer.

Conclusions: In conclusion, our findings demonstrate that [99mTc]Tc-PSMA SPECT/CT exhibits favorable diagnostic performance for prostate cancer and can provide valuable supplementary information, particularly in regions and settings where [68Ga]Ga-PSMA PET/CT availability is limited, such as remote areas. These results highlight the potential of [99mTc]Tc-PSMA SPECT/CT as a valuable tool in the diagnosis and management of prostate cancer, warranting further investigation and validation in larger patient cohorts.

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2 (68)Ga-PSMA-11 PET and mpMRI in the Diagnosis of Initial Lymph Node Staging of Prostate Cancer: a Head-To-Head Comparative Meta-Analysis

Wang Y, Jing R, Wang H, Zhao Q.Front Med (Lausanne). 2024 Jun 20;11:1425134. doi: 10.3389/fmed.2024.1425134. eCollection 2024.PMID: 38966530.

Abstract

Purpose: This meta-analysis evaluates the comparative diagnostic efficacy of 68Ga-prostate-specific membrane antigen-11 PET (68Ga-PSMA-11 PET) and multiparametric MRI (mpMRI) for the initial lymph node staging of prostate cancer.

Conclusion: Our findings indicated that 68Ga-PSMA-11 PET and mpMRI exhibit similar sensitivity and specificity in the diagnosis of initial lymph node staging of prostate cancer. However, given that most included studies were retrospective, further prospective studies with larger sample sizes are essential to validate these results.

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3 Diagnostic Performance of MRI in Detecting Prostate Cancer in Patients with Prostate-Specific Antigen Levels of 4-10 ng/mL: a Systematic Review and Meta-Analysis

Guo E, Xu L, Zhang D, Zhang J, Zhang X, Bai X, Chen L, Peng Q, Zhang G, Jin Z, Sun H.Insights Imaging. 2024 Jun 18;15(1):147. doi: 10.1186/s13244-024-01699-4.PMID: 38886256.

Abstract

Objective: To investigate the diagnostic performance of MRI in detecting clinically significant prostate cancer (csPCa) and prostate cancer (PCa) in patients with prostate-specific antigen (PSA) levels of 4-10 ng/mL.

Conclusion: Prostate MRI enables the detection of csPCa and PCa with satisfactory performance in the PSA gray zone. The excellent NPV for csPCa detection indicates the possibility of biopsy decision-making in patients in the PSA gray zone, but substantial heterogeneity among the included studies should be taken into account.

Clinical relevance statement: Prostate MRI can be considered a reliable and satisfactory tool for detecting csPCa and PCa in patients with PSA in the "gray zone", allowing for reducing unnecessary biopsy and optimizing the overall examination process.

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4 Advancements in PSMA Ligand Radiolabeling for Diagnosis and Treatment of Prostate Cancer: a Systematic Review

Yan Y, Zhuo H, Li T, Zhang J, Tan M, Chen Y.Front Oncol. 2024 Mar 21;14:1373606. doi: 10.3389/fonc.2024.1373606. eCollection 2024.PMID: 38577331. Review.

Abstract

Prostate cancer(PCa), a leading global health concern, profoundly impacts millions of men worldwide. Progressing through two stages, it initially develops within the prostate and subsequently extends to vital organs such as lymph nodes, bones, lungs, and the liver. In the early phases, castration therapy is often employed to mitigate androgen effects. However, when prostate cancer becomes resistant to this treatment, alternative strategies become imperative. As diagnostic and treatment methodologies for prostate cancer continually advance, radioligand therapy (RLT) has emerged as a promising avenue, yielding noteworthy outcomes. The fundamental principle of RLT involves delivering radionuclide drugs to cancerous lesions through specific carriers or technologies. Subsequently, these radionuclide drugs release radioactive energy, facilitating the destruction of cancer cell tissues. At present, the positron emission tomography (PET) targeting PSMA has been widely developed for the use of diagnosis and staging of PCa. Notably, FDA-approved prostate-specific membrane antigen (PSMA) targeting agents, such as 68Ga-PSMA-11 and 177Lu-PSMA-617, represent significant milestones in enhancing diagnostic precision and therapeutic efficacy. This review emphasizes the current research status and outcomes of various radionuclide-labeled PSMA ligands. The objective is to provide valuable insights for the continued advancement of diagnostic and therapeutic approaches in the realm of prostate cancer.

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5 [(177)Lu]Lu-PSMA-Radioligand Therapy Efficacy Outcomes in Taxane-Naive Versus Taxane-Treated Patients with Metastatic Castration-Resistant Prostate Cancer: a Systematic Review and Metaanalysis

Satapathy S, Sahoo RK, Bal C.J Nucl Med. 2023 Aug;64(8):1266-1271. doi: 10.2967/jnumed 123.265414. Epub 2023 May 11.PMID: 37169534.

Abstract

Radioligand therapy (RLT) with 177Lu-prostate-specific membrane antigen (PSMA) inhibitors ([177Lu]Lu-PSMA) is currently approved for patients with metastatic castration-resistant prostate cancer (mCRPC) after progression with at least 1 taxane and 1 androgen-receptor-pathway inhibitor. However, the impact of prior chemotherapy on [177Lu]Lu-PSMA-RLT outcomes is debatable, with various studies showing inconsistent results. This study was conducted to precisely evaluate the impact of prior taxane chemotherapy on response and survival outcomes in mCRPC patients after [177Lu]Lu-PSMA-RLT. Conclusion: mCRPC patients with no prior taxanes had significantly better outcomes after [177Lu]Lu-PSMA-RLT than did taxane-treated patients. Further trials evaluating [177Lu]Lu-PSMA-RLT in the taxane-naïve setting are now required.

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6 The Diagnostic Performance of Tumor Stage on MRI for Predicting Prostate Cancer-Positive Surgical Margins: a Systematic Review and Meta-Analysis

Wang Y, Wu Y, Zhu M, Tian M, Liu L, Yin L.Diagnostics (Basel). 2023 Jul 27;13(15):2497. doi: 10.3390/diagnostics13152497.PMID: 37568860. Review.

Abstract

Purpose: Surgical margin status in radical prostatectomy (RP) specimens is an established predictive indicator for determining biochemical prostate cancer recurrence and disease progression. Predicting positive surgical margins (PSMs) is of utmost importance. We sought to perform a meta-analysis evaluating the diagnostic utility of a high clinical tumor stage (≥3) on magnetic resonance imaging (MRI) for predicting PSMs.

Conclusions: T stage on MRI has moderate diagnostic accuracy for predicting PSMs. When determining the treatment modality, clinicians should consider the factors contributing to heterogeneity for this purpose.

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7 Diagnostic Performance of MRI for Prediction of Recurrent Prostate Cancer after High-Intensity Focused Ultrasound: a Systematic Review and Meta-Analysis

Ahn H, Hwang SI, Lee HJ, Kim SY, Cho JY, Lee H, Hong SK, Byun SS, Kim TM.Prostate Int. 2023 Jun;11(2):59-68. doi: 10.1016/j.prnil.2022.12.004. Epub 2022 Dec 24.PMID: 37409098. Review.

Abstract

Purpose: This article aims to evaluate the pooled diagnostic performance control MRI for prediction of recurrent prostate cancer (PCa) after high-intensity focused ultrasound (HIFU).

Results: Nineteen studies (703 patients) were included. All included studies satisfied at least four of the seven QUADAS-2 domains. Pooled sensitivity was 0.81 (95% CI 0.72-0.90) with specificity of 0.91 (95% CI 0.86-0.96), with area under the SROC curve of 0.81. Larger studies including more than 50 patients showed relatively poor sensitivity (0.68 vs. 0.84) and specificity (0.75 vs. 0.93). The diagnostic performance of studies reporting higher nadir serum prostate-specific antigen levels (>1 ng/mL) after HIFU was inferior, and differed significantly in sensitivity (0.54 vs. 0.78) rather than specificity (0.85 vs. 0.91).

Conclusions: Although MRI showed adequate diagnostic performance in predicting PCa recurrence after HIFU, these results may have been exaggerated.

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8 Recurrent Prostate Cancer Diagnostics with (18)F-PSMA-1007 PET/CT: a Systematic Review of the Current State

Saule L, Radzina M, Liepa M, Roznere L, Lioznovs A, Ratniece M, Mamis E, Vjaters E.Diagnostics (Basel). 2022 Dec 15;12(12):3176. doi: 10.3390/diagnostics12123176.PMID: 36553183. Review.

Abstract

Background: Early diagnosis of recurrent prostate cancer is a cornerstone for further adequate therapy planning. Therefore, clinical practice and research still focuses on diagnostic tools that can detect prostate cancer in early recurrence when it is undetectable in conventional diagnostic imaging. 18F-PSMA-1007 PET/CT is a novel method to evaluate patients with biochemical recurrent PCa. The aim of this review was to evaluate the role of 18F-PSMA-1007 PET/CT in prostate cancer local recurrence, lymph node metastases and bone metastases detection.

Conclusions: 18F-PSMA-1007 PET/CT appears to achieve reliable performance in detecting recurrent prostate cancer. The high detection rate of 18F-PSMA-1007 PET/CT in recurrent prostate cancer was confirmed, especially in local recurrence and small lymph nodes with non-specific characteristics on conventional diagnostic imaging methods. However, several authors emphasize some limitations for this tracer-for example, non-specific uptake in bone lesions that can mimic bone metastases.

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9 Comparative Performance of Deep Learning and Radiologists for the Diagnosis and Localization of Clinically Significant Prostate Cancer at MRI: a Systematic Review

Roest C, Fransen SJ, Kwee TC, Yakar D.Life (Basel). 2022 Sep 26;12(10):1490.
doi: 10.3390/life12101490.PMID: 36294928. Review.

Abstract

Background: Deep learning (DL)-based models have demonstrated an ability to automatically diagnose clinically significant prostate cancer (PCa) on MRI scans and are regularly reported to approach expert performance. The aim of this work was to systematically review the literature comparing deep learning (DL) systems to radiologists in order to evaluate the comparative performance of current state-of-the-art deep learning models and radiologists.

Results: The final selection consisted of eight studies with a combined 7337 patients. The median study quality with CLAIM was 74.1% (IQR: 70.6-77.6). DL achieved an identical patient-level performance to the radiologists for PI-RADS ≥ 3 (both 97.7%, SD = 2.1%). DL had a lower sensitivity for PI-RADS ≥ 4 (84.2% vs. 88.8%, p = 0.43). The sensitivity of DL for lesion localization was also between 2% and 12.5% lower than that of the radiologists.

Conclusions: DL models for the diagnosis of csPCa on MRI appear to approach the performance of experts but currently have a lower sensitivity compared to experienced radiologists. There is a need for studies with larger datasets and for validation on external data.

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10 Diagnostic Value of 3.0 T versus 1.5 T MRI in Staging Prostate Cancer: Systematic Review and Meta-Analysis

Virarkar M, Szklaruk J, Diab R, Bassett R, Bhosale P.Pol J Radiol. 2022 Jul 29;87:e421-e429.
doi: 10.5114/pjr.2022.118685. eCollection 2022.PMID: 35979151.

Abstract

Purpose: To compare the diagnostic performance of 3.0 T and 1.5 T MRI in the staging of prostate cancer.

Results: Out of 8 studies identified, 4 met the inclusion criteria. 3.0 T (n = 160) had a pooled sensitivity of 69.5% (95% CI: 56.4-80.1%) and a pooled specificity of 48.8% (95% CI: 6.0-93.4%), while 1.5 T (n = 139) had a pooled sensitivity of 70.6% (95% CI: 55.0-82.5%; p = 0.91) and a pooled specificity of 41.7% (95% CI: 6.2-88.6%; p = 0.88). The pooled DOR for 3.0 T was 3 (95% CI: 0-26.0%), while the pooled DOR for 1.5 T was 2 (95% CI: 0-18.0%), which was not a significant difference (p = 0.89).

Conclusions: 3.0 T has slightly better diagnostic performance than 1.5 T MRI in prostate cancer staging (3 vs. 2), although without statistical significance. Our findings suggest the need for larger, randomized trials directly comparing 3.0 T and 1.5 T MRI in prostate cancer.

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11 Quality of Multicenter Studies Using MRI Radiomics for Diagnosing Clinically Significant Prostate Cancer: a Systematic Review

Bleker J, Kwee TC, Yakar D.Life (Basel). 2022 Jun 23;12(7):946. doi: 10.3390/life12070946.PMID: 35888036. Review.

Abstract

Background: Reproducibility and generalization are major challenges for clinically significant prostate cancer modeling using MRI radiomics. Multicenter data seem indispensable to deal with these challenges, but the quality of such studies is currently unknown. The aim of this study was to systematically review the quality of multicenter studies on MRI radiomics for diagnosing clinically significant PCa. Results: Four studies were included. The average total CLAIM score was 74.6% and the average RQS was 52.8%. The corresponding average total quality score (CLAIM + RQS) was 63.7%. Conclusions: A very small number of multicenter radiomics PCa classification studies have been performed with the existing studies being of bad or average quality. Good multicenter studies might increase by encouraging preferably prospective data sharing and paying extra care to documentation in regards to reproducibility and clinical utility.

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12 MRI/Transrectal Ultrasound Fusion-Guided Targeted Biopsy and Transrectal Ultrasound-Guided Systematic Biopsy for Diagnosis of Prostate Cancer: a Systematic Review and Meta-analysis

Xie J, Jin C, Liu M, Sun K, Jin Z, Ding Z, Gong X.Front Oncol. 2022 May 23;12:880336. doi: 10.3389/fonc.2022.880336. eCollection 2022.PMID: 35677152.

Abstract

Purpose: For men suspected of having prostate cancer (PCa), the transrectal ultrasound (TRUS)-guided systematic biopsy (SB) was performed. MRI/TRUS fusion guided-targeted biopsy (MRI-TB) could enhance PCa detection, allowing sampling of sites at higher risk which were not obvious with TRUS alone. The aim of this systematic review and meta-analysis was to compare the detection rates of prostate cancer by MRI-TB or MRI-TB plus SB versus SB, mainly for diagnosis of high-risk PCa.

Conclusion: Compared with systematic protocols, MRI-TB detects more clinically significant and high-risk PCa cases, and fewer clinically insignificant PCa cases. MRI-TB combined with SB enhances PCa detection in contrast with either alone but did not reduce the diagnosis rate of clinically insignificant PCa.

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13 (177) Lu-PSMA Radioligand Therapy Effectiveness in Metastatic Castration-Resistant Prostate Cancer: an Updated Systematic Review and Meta-Analysis

Sadaghiani MS, Sheikhbahaei S, Werner RA, Pienta KJ, Pomper MG, Gorin MA, Solnes LB, Rowe SP.Prostate. 2022 May;82(7):826-835. doi: 10.1002/pros.24325. Epub 2022 Mar 14.PMID: 35286735.

Abstract

Background: An updated systematic review and meta-analysis of relevant studies to evaluate the effectiveness of prostate-specific membrane antigen (PSMA)-targeted endoradiotherapy/radioligand therapy (PRLT) in castration resistant prostate cancer (CRPC).

Methods: A systematic search was performed in July 2020 using PubMed/Medline database to update our prior systematic review. The search was limited to papers published from 2019 to June 2020. A total of 472 papers were reviewed. The studied parameters included pooled proportion of patients showing any or ≥50% prostate-specific antigen (PSA) decline after PRLT. Survival effects of PRLT were assessed based on pooled hazard ratios (HRs) of the overall survival (OS) according to any PSA as well as ≥50% PSA decline after PRLT. Response to therapy based on ≥50% PSA decrease after PRLT versus controls was evaluated using Mantel-Haenszel random effect meta-analysis. All p values < 0.05 were considered as statistically significant.

Results: A total of 45 publications were added to the prior 24 studies. 69 papers with total of 4157 patients were included for meta-analysis. Meta-analysis of the two recent randomized controlled trials showed that patients treated with 177 Lu-PSMA 617 had a significantly higher response to therapy compared to controls based on ≥50% PSA decrease. Meta-analysis of the HRs of OS according to any PSA decline and ≥50% PSA decline showed survival prolongation after PRLT.

Conclusions: PRLT results in higher proportion of patients responding to therapy based on ≥50% PSA decline compared to controls. Any PSA decline and ≥50% PSA decline showed survival prolongation after PRLT.

Advances in knowledge: This is the first meta-analysis to aggregate the recent randomized controlled trials of PRLT which shows CRPC patients had a higher response to therapy after PRLT compared to controls.

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14 PSMA and Choline PET for the Assessment of Response to Therapy and Survival Outcomes in Prostate Cancer Patients: a Systematic Review from the Literature

Alongi P, Laudicella R, Lanzafame H, Farolfi A, Mapelli P, Picchio M, Burger IA, Iagaru A, Minutoli F, Evangelista L.Cancers (Basel). 2022 Mar 31;14(7):1770. doi: 10.3390/cancers14071770.PMID: 35406542. Review.

Abstract

The aims of this systematic review were to (1) assess the utility of PSMA-PET and choline-PET in the assessment of response to systemic and local therapy, and to (2) determine the value of both tracers for the prediction of response to therapy and survival outcomes in prostate cancer. We performed a systematic literature search in PubMed/Scopus/Google Scholar/Cochrane/EMBASE databases (between January 2010 and October 2021) accordingly. The quality of the included studies was evaluated following the "Quality Assessment of Prognostic Accuracy Studies" tool (QUAPAS-2). We selected 40 articles: 23 articles discussed the use of PET imaging with [68Ga]PSMA-11 (16 articles/1123 patients) or [11C]/[18F]Choline (7 articles/356 patients) for the prediction of response to radiotherapy (RT) and survival outcomes. Seven articles (three with [68Ga]PSMA-11, three with [11C]Choline, one with [18F]Choline) assessed the role of PET imaging in the evaluation of response to docetaxel (as neoadjuvant therapy in one study, as first-line therapy in five studies, and as a palliative regimen in one study). Seven papers with radiolabeled [18F]Choline PET/CT (n = 121 patients) and three with [68Ga]PSMA-11 PET (n = 87 patients) were selected before and after enzalutamide/abiraterone acetate. Finally, [18F]Choline and [68Ga]PSMA-11 PET/CT as gatekeepers for the treatment of metastatic prostate cancer with Radium-223 were assessed in three papers. In conclusion, in patients undergoing RT, radiolabeled choline and [68Ga]PSMA-11 have an important prognostic role. In the case of systemic therapies, the role of such new-generation imaging techniques is still controversial without sufficient data, thus requiring additional in this scenario.

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15 Diagnostic Accuracy of (18)F-PSMA-1007 PET/CT for Prostate Cancer in Primary Staging and Biochemical Recurrence with Different Serum PSA Levels: a Systematic Review and Meta-Analysis

Liu X, Wang Q, Zhang B, Jiang T, Zeng W.Hell J Nucl Med. 2022 Jan-Apr;25(1):88-102. doi: 10.1967/s002449912438. Epub 2022 Apr 8.PMID: 35388806.

Abstract

Objective: We performed a systematic review and meta-analysis to evaluate the application value of fluorine-18-prostate specific membrane antigen (18F-PSMA-1007) positron emission tomography/computed tomography (PET/CT) in patients with different serum prostate specific antigen (PSA) levels and primary prostate cancer (PCa) or the biochemical recurrence of PCa.

Conclusion: This meta-analysis showed that 18F-PSMA-1007 PET/CT has a higher diagnostic value for prostate cancer in the setting of primary PCa and biochemical recurrence. As serum PSA levels increase, the diagnostic accuracy of 18F-PSMA-1007 PET/CT also improves.

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16 Efficacy and Safety of (225)Ac-PSMA-617-Targeted Alpha Therapy in Metastatic Castration-Resistant Prostate Cancer: a Systematic Review and Meta-Analysis

Ma J, Li L, Liao T, Gong W, Zhang C.Front Oncol. 2022 Feb 3;12:796657. doi: 10.3389/fonc.2022.796657. eCollection 2022.PMID: 35186737.

Abstract

Objective: To conduct a meta-analysis of the efficacy and safety of 225Ac-PSMA-617 in the treatment of metastatic castration-resistant prostate cancer based on existing clinical evidence.

Results: A total of 6 retrospective studies, namely, 201 patients, were included in the final analysis. The pooled proportions of patients with decreased PSA and PSA decreased by more than 50% were 87.0% (95% confidence interval, 0.820 to 0.920) and 66.1% (95% confidence interval, 0.596 to 0.726), respectively. The pooled proportions of OS and PFS were 12.5 months (95%CI: 6.2-18.8 months) and 9.1 months (95%CI: 2.6-15.7 months). The patients showing molecular responses were 54% (95% confidence interval: 25-84%). In all studies, the most common side effect of 225Ac-PSMA-617 TAT was xerostomia, with any degree of xerostomia occurring in 77.1% (155 out of 201), and grade III only accounted for 3.0%. The second was 30.3% (61 out of 201) anemia of any degree, and grade III accounts for 7.5% (15 out of 201). Grade III leukopenia and thrombocytopenia were 4.5% (9 out of 201) and 5.5% (11 out of 201), respectively. Only 6 (3.0%) of 201 patients had Grade III nephrotoxicity.

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17 Potential Targets Other Than PSMA for Prostate Cancer Theranostics: a Systematic Review

Gauthé M, Sargos P, Barret E, Fromont-Hankard G, Beauval JB, Brureau L, Créhange G, Renard-Penna R, Dariane C, Fiard G, Mathieu R, Roubaud G, Ruffion A, Rouprêt M, Ploussard G, On Behalf Of The Cc-Afu.J Clin Med. 2021 Oct 24;10(21):4909. doi: 10.3390/jcm10214909.PMID: 34768432. Review.

Abstract

Background: Prostate-specific membrane antigen (PSMA) is not sufficiently overexpressed in a small proportion of prostate cancer (PCa) patients, who require other strategies for imaging and/or treatment. We reviewed potential targets other than PSMA for PCa theranostics in nuclear medicine that have already been tested in humans.

Results: We included 38 studies on six different targets: gastrin-releasing peptide receptors (GRPRs) (n = 23), androgen receptor (n = 11), somatostatin receptors (n = 6), urokinase plasminogen activator surface receptor (n = 4), fibroblast activation protein (n = 2 studies) and integrin receptors (n = 1). GRPRs, the most studied target, has a lower expression in high-grade PCa, CRPC and bone metastases. Its use might be of higher interest in treating earlier stages of PCa or low-grade PCa. Radiolabeled fibroblast activation protein inhibitors were the most recent and promising molecules, but specific studies reporting their interest in PCa are needed.

Conclusion: Theranostics in nuclear medicine will continue to develop in the future, especially for PCa patients. Targets other than PSMA exist and deserve to be promoted.

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18 (177)Lu-PSMA Radioligand Therapy Is Favorable as Third-Line Treatment of Patients with Metastatic Castration-Resistant Prostate Cancer. A Systematic Review and Network Meta-Analysis of Randomized Controlled Trials

Eyben FE, Kairemo K, Paller C, Hoffmann MA, Paganelli G, Virgolini I, Roviello G.Biomedicines. 2021 Aug 19;9(8):1042. doi: 10.3390/biomedicines9081042.PMID: 34440246. Review.

Abstract

In this systematic review and network meta-analysis (NMA), we aimed to assess the benefits and harms of third-line (L3) treatments in randomized controlled trials (RCTs) of patients with metastatic castration-resistant prostate cancer (mCRPC). Two reviewers searched for publications from 1 January 2006 to 30 June 2021. The review analyzed seven RCTs that included 3958 patients and eight treatments. Treatment with prostate-specific membrane antigen (PSMA)-based radioligand therapy (PRLT) resulted in a 1.3-times-higher rate of median PSA decline ≥50% than treatment with abiraterone, enzalutamide, mitoxantrone, or cabazitaxel (p = 0.00001). The likelihood was 97.6% for PRLT to bring about the best PSA response, out of the examined treatments. PRLT resulted in a 1.1-times-higher six-month rate of median radiographic progression-free survival. Treatment with PRLT in the VISION trial resulted in 1.05-times-higher twelve-month median overall survival than L3 treatment with cabazitaxel in other RCTs. PRLT more often resulted in severe thrombocytopenia and less often in severe leukopenia than did cabazitaxel. In conclusion, for patients with mCRPC, L3 treatment with PRLT is highly effective and safe.

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19 The Diagnostic Role of (18)F-Choline, (18)F-Fluciclovine and (18)F-PSMA PET/CT in the Detection of Prostate Cancer With Biochemical Recurrence: a Meta-Analysis

Wang R, Shen G, Huang M, Tian R.Front Oncol. 2021 Jun 17;11:684629. doi: 10.3389/fonc.2021.684629. eCollection 2021.PMID: 34222008.

Abstract

Background: Diagnosing the biochemical recurrence (BCR) of prostate cancer (PCa) is a clinical challenge, and early detection of BCR can help patients receive optimal treatment. We conducted a meta-analysis to define the diagnostic accuracy of PET/CT using 18F-labeled choline, fluciclovine, and prostate-specific membrane antigen (PSMA) in patients with BCR.

Conclusion: These three 18F-labeled tracers are promising for detecting BCR in prostate cancer patients, with 18F-choline showing superior diagnostic accuracy. In addition, the much higher detection rates of 18F-PSMA showed its superiority over other tracers, particularly in low PSA levels.

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20 Diagnostic Role of (18)F-PSMA-1007 PET/CT in Prostate Cancer Staging: a Systematic Review

Awenat S, Piccardo A, Carvoeiras P, Signore G, Giovanella L, Prior JO, Treglia G.Diagnostics (Basel). 2021 Mar 19;11(3):552. doi: 10.3390/diagnostics11030552.PMID: 33808825. Review.

Abstract

Background: The use of prostate-specific membrane antigen (PSMA)-targeted agents for staging prostate cancer (PCa) patients using positron emission tomography/computed tomography (PET/CT) is increasing worldwide. We performed a systematic review on the role of 18F-PSMA-1007 PET/CT in PCa staging to provide evidence-based data in this setting.

Conclusions: 18F-PSMA-1007 PET/CT demonstrated a good accuracy in PCa staging, with similar results compared with other PSMA-targeted radiopharmaceuticals. This method could substitute bone scintigraphy and conventional abdominal imaging for PCa staging. Prospective multicentric studies are needed to confirm these findings.

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21 Concordance between Response Assessment Using Prostate-Specific Membrane Antigen PET and Serum Prostate-Specific Antigen Levels after Systemic Treatment in Patients with Metastatic Castration Resistant Prostate Cancer: a Systematic Review and Meta-Analysis

Han S, Woo S, Kim YI, Lee JL, Wibmer AG, Schoder H, Ryu JS, Vargas HA.Diagnostics (Basel). 2021 Apr 7;11(4):663. doi: 10.3390/diagnostics11040663.PMID: 33917006. Review.

Abstract

Prostate-specific membrane antigen positron emission tomography (PSMA PET) has recently gained interest as a promising tool for treatment response evaluation in metastatic castration-resistant prostate cancer (CRPC). We performed a systematic review and meta-analysis assessing the concordance between response evaluation using PSMA PET and serum prostate-specific antigen (PSA) level after systemic treatment and the association between PSMA PET and overall survival in metastatic CRPC patients. PubMed, Embase, and Cochrane library databases were searched until August 2020. Studies that reported the concordance between PSMA PET and PSA response were included. PSMA PET and PSA response evaluation were dichotomized into response vs. non-response to construct two-by-two contingency tables; an ≥30% increase in PSMA PET according to PET Response Criteria in Solid Tumors 1.0 and as an increase in serum PSA level of ≥25% as per Prostate Cancer Working Group 3 guidelines were defined as non-response. The percent agreement rates were pooled using random-effect model. Ten studies (268 patients) were included. The concordance rates ranged 0.50-0.84 with a pooled proportion of 0.73 (95% confidence interval 0.67-0.79). Patients were treated with 177Lu-PSMA therapy in five, chemotherapy in three, 223Ra in one, and more than one type in one study. Various PET parameters were used: the most widely evaluated was PSMA tumor volume (PSMA-TV). Similar proportions were found across different therapeutic agents, PET response parameters, and regarding directionality of discordance (PSA response/PSMA non-response vs. PSMA response/PSA non-response). Two studies reported that a decrease in PSMA-TV was associated with better overall survival. PSMA PET and PSA response assessments were discordant in nearly a fourth of metastatic CRPC patients. Further studies are warranted to establish the clinical meaning of this discordance and define appropriate management for such clinical situation.

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22 Impact of PI-RADS Category 3 Lesions on the Diagnostic Accuracy of MRI for Detecting Prostate Cancer and the Prevalence of Prostate Cancer within Each PI-RADS Category: a Systematic Review and Meta-Analysis

Wadera A, Alabousi M, Pozdnyakov A, Kashif Al-Ghita M, Jafri A, McInnes MD, Schieda N, van der Pol CB, Salameh JP, Samoilov L, Gusenbauer K, Alabousi A.Br J Radiol. 2021 Feb 1;94(1118):20191050. doi: 10.1259/bjr.20191050. Epub 2020 Oct 22.PMID: 33002371.

Abstract

Objective: To evaluate Prostate Imaging Reporting and Data System (PI-RADS) category 3 lesions' impact on the diagnostic test accuracy (DTA) of MRI for prostate cancer (PC) and to derive the prevalence of PC within each PI-RADS category.

Conclusion: PI-RADS category 3 lesions can significantly impact the DTA of MRI for PC detection. A low prevalence of clinically significant PC is noted in PI-RADS category 1 and 2 cases.

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Neuroendocrine Tumours.
The following is a non-exhaustive bibliography of systematic reviews that are free to access, published years 2021-2024 on the field of Neuroendocrine Tumours.

23 Application of Artificial Intelligence in Neuroendocrine Lung Cancer Diagnosis and Treatment: a Systematic Review

Pokhriyal SC, Shukla A, Gupta U, Al-Ghuraibawi MMH, Yadav R, Panigrahi K.Cureus. 2024 May 24;16(5):e61012. doi: 10.7759/cureus.61012. eCollection 2024 May.PMID: 38910787. Review.

Abstract

Neuroendocrine tumors (NETs) represent a heterogeneous group of neoplasms with diverse clinical presentations and prognoses. Accurate and timely diagnosis of these tumors is crucial for appropriate management and improved patient outcomes. In recent years, exciting advancements in artificial intelligence (AI) technologies have been revolutionizing medical diagnostics, particularly in the realm of detecting and characterizing pulmonary NETs, offering promising avenues for improved patient care. This article aims to provide a comprehensive overview of the role of AI in diagnosing lung NETs. We discuss the current challenges associated with conventional diagnostic approaches, including histopathological examination and imaging modalities. Despite advancements in these techniques, accurate diagnosis remains challenging due to the overlapping features with other pulmonary lesions and the subjective interpretation of imaging findings. AI-based approaches, including machine learning and deep learning algorithms, have demonstrated remarkable potential in addressing these challenges. By leveraging large datasets of radiological images, histopathological samples, and clinical data, AI models can extract complex patterns and features that may not be readily discernible to human observers. Moreover, AI algorithms can continuously learn and improve from new data, leading to enhanced diagnostic accuracy and efficiency over time. Specific AI applications in the diagnosis of lung NETs include computer-aided detection and classification of pulmonary nodules on CT scans, quantitative analysis of PET imaging for tumor characterization, and integration of multi-modal data for comprehensive diagnostic assessments. These AI-driven tools hold promise for facilitating early detection, risk stratification, and personalized treatment planning in patients with lung NETs.

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24 Diagnostic and Therapeutic Management of Primary Orbital Neuroendocrine Tumors (NETs): Systematic Literature Review and Clinical Case Presentation

Arrivi G, Specchia M, Pilozzi E, Rinzivillo M, Caruso D, Santangeli C, Prosperi D, Ascolese AM, Panzuto F, Mazzuca F.Biomedicines. 2024 Feb 6;12(2):379. doi: 10.3390/biomedicines12020379.PMID: 38397981. Review.

Abstract

Background: The ocular involvement of neuroendocrine neoplasms (NENs) is uncommon and mainly represented by metastases from gastrointestinal and lung neuroendocrine tumors. Primary orbital NENs are even less common and their diagnostic and therapeutic management is a challenge.

Conclusions: A multidisciplinary approach is required for the management of primary orbital NENs, emphasizing the importance of early referral to dedicated centers for prompt differential diagnosis, tailored treatment, and an improved quality of life and survival.

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25 PET/CT and Conventional Imaging for the Assessment of Neuroendocrine Prostate Cancer: a Systematic Review

Dondi F, Antonelli A, Suardi N, Guerini AE, Albano D, Lucchini S, Camoni L, Treglia G, Bertagna F.Cancers (Basel). 2023 Sep 3;15(17):4404. doi: 10.3390/cancers15174404.PMID: 37686680. Review.

Abstract

Background: Neuroendocrine prostate cancer (NEPC) is a rare neoplasm, and the role of both conventional imaging (CI) and positron emission tomography/computed tomography (PET/CT) for its assessment has not been clearly evaluated and demonstrated. The aim of this systematic review was to analyze the diagnostic performances of these imaging modalities in this setting.

Conclusion: Published data on the role of PET/CT for the assessment of NEPC are limited. At present, it is still uncertain which tracer performs best, and although [18F]FDG has been evaluated and seems to offer some advantages in availability and clinical staging, other tracers may be more useful to understand tumor biology or identify targets for subsequent radioligand therapy. Further research is therefore desirable. In contrast, data are still limited to draw a final conclusion on the role and the specific characteristics of CI in this rare form of neoplasm, and therefore, more studies are needed in this setting.

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26 Efficacy of Endoscopic Mucosal Resection versus Endoscopic Submucosal Dissection for Rectal Neuroendocrine Tumors 10mm: a Systematic Review and Meta-Analysis

Zhou C, Zhang F, We Y.Ann Saudi Med. 2023 May-Jun;43(3):179-195. doi: 10.5144/0256-4947.2023.179. Epub 2023 Jun 1.PMID: 37270677. Review.

Abstract

Background: Endoscopic mucosal resection (EMR) and endoscopic submucosal dissection (ESD) are surgical methods used for rectal neuroendocrine tumors (NETs) with diameters of ≤ 10 mm. However, which method has a higher performance remains uncertain.

Results: Eighteen retrospective cohort studies were included in this meta-analysis. There were no statistical differences in the rates of complete resection, en bloc resection, recurrence, perforation, and bleeding rates between EMR and ESD. However, a statistical difference was detected in the procedure time; EMR had a significantly shorter time (MD=-17.47, 95% CI=-22.31 - -12.62, P<.00001).

Conclusions: EMR and ESD had similar efficacies and safety profiles in resectioning rectal NETs ≤ 10 mm. Even so, the advantages of EMR included a shorter operation time and expenditure. Thus, with respect to health economics, EMR outperformed ESD.

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27 Precision Radiotherapy Using MR-Linac for Pancreatic Neuroendocrine Tumors in MEN1 Patients (PRIME): a Protocol for a Phase I-II Trial, and Systematic Review on Available Evidence for Radiotherapy of pNETs

van Vliembergen ENM, Eijkelenkamp H, Valk GD, Vriens MR, Meijer GJ, Intven MPW, de Laat JM.Front Endocrinol (Lausanne). 2023 May 26;14:994370. doi: 10.3389/fendo.2023.994370. eCollection 2023.PMID: 37305036.

Abstract

Background: Surgical resection is the standard of care for the treatment of pancreatic neuroendocrine tumors (pNETs) in patients with Multiple Endocrine Neoplasia Type 1 (MEN1). However, surgery can cause significant short- and long-term morbidity. Magnetic resonance-guided radiotherapy (MRgRT) is a potential effective treatment with little side effects. With traditional radiotherapy techniques, irradiation of pancreatic tumors to high dose levels was hampered by poor visibility of the tumor during treatment. MRgRT uses onboard MRI to guide the treatment, thereby enabling delivery of ablative irradiation doses to the tumor, while sparing surrounding tissues. In this study, we describe results from a systematic review assessing efficacy of radiotherapy in pNET and present the protocol of the PRIME study.

Conclusion and trial design: Due to the limited literature available and concerns about damage to surrounding tissue, conventional radiotherapy is currently little used for pNETs. The PRIME study is a phase I-II trial with a single arm prospective cohort study design, investigating the efficacy of MRgRT in MEN1 patients with pNET. MEN1 patients with growing pNETs with a size between 1.0 and 3.0 cm without malignant features are eligible for inclusion. Patients are treated with 40 Gy in 5 fractions on the pNET, using online adaptive MRgRT on a 1.5T MR-linac. The primary endpoint is the change in tumor size at MRI 12 months follow-up. Secondary endpoints include radiotoxicity, quality of life, endocrine and exocrine pancreas function, resection rate, metastatic free and overall survival. When MRgRT is found effective with low radiotoxicity, it could reduce the need for surgery for pNET and preserve quality of life.

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28 Neuroendocrine Carcinomas with Atypical Proliferation Index and Clinical Behavior: a Systematic Review

Feola T, Centello R, Sesti F, Puliani G, Verrico M, Di Vito V, Di Gioia C, Bagni O, Lenzi A, Isidori AM, Giannetta E, Faggiano A.Cancers (Basel). 2021 Mar 12;13(6):1247. doi: 10.3390/cancers13061247.PMID: 33809007.

Abstract

Background: Highly proliferative (G3) neuroendocrine neoplasms are divided into well differentiated tumors (NETs) and poorly differentiated carcinomas (NECs), based on the morphological appearance. This systematic review aims to evaluate the clinicopathological features and the treatment response of the NEC subgroup with a Ki67 labeling index (LI) < 55%.

Conclusions: NECs are heterogeneous tumors. The subgroup with a Ki67 LI < 55% has a better prognosis and should be treated and monitored differently from NECs with a Ki67 LI ≥ 55%.

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29 Update in Clinical Management for Gallbladder Neuroendocrine Carcinoma

Chu H, Shi Y, Liu J, Huang D, Zhang J, Dou C.Medicine (Baltimore). 2021 Apr 9;100(14):e25449. doi: 10.1097/MD.0000000000025449.PMID: 33832150.

Abstract

Background: Gallbladder neuroendocrine carcinoma (GB-NEC) is rare and there are few reports at present. We sought to review the current knowledge of GB-NEC and provide recommendations for clinical management.

Conclusion: Typical imaging features could be helpful for preoperative diagnosis. Age, margin status, tumor size, marital status, histopathologic subtype and SEER stage may be independent predictors for the survival. Remarkable advances regarding the treatment for GB-NEC have been achieved in recent years. Further studies are needed to investigate the survival benefit of lymphadenectomy for patients with GB-NEC.

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30 Neuroendocrine Carcinoma of the Minor Papilla with Pancreas Divisum: a Case Report and Review of the Literature

Saito K, Matsuo Y, Denda Y, Nonoyama K, Murase H, Kato T, Hayashi Y, Imafuji H, Morimoto M, Ogawa R, Takahashi H, Takiguchi S.J Med Case Rep. 2023 Mar 28;17(1):127. doi: 10.1186/s13256-023-03828-x.PMID: 36973791.

Abstract

Background: Neuroendocrine tumors of the minor papilla are very rare, and only 20 cases have been reported in the literature. Neuroendocrine carcinoma of the minor papilla with pancreas divisum has not been reported previously, making this the first reported case. Neuroendocrine tumors of the minor papilla have been reported in association with pancreas divisum in about 50% of cases reported in the literature. We herein present our case of neuroendocrine carcinoma of the minor papilla with pancreas divisum in a 75-year-old male with a systematic literature review of the previous 20 reports of neuroendocrine tumors of the minor papilla.

Conclusion: In our case, because the tumor was discovered during a medical check-up relatively early in the course of disease, the patient was doing well at the 15-year follow-up visit, with no evidence of tumor recurrence. Diagnosing a tumor of the minor papilla is very difficult because of the relatively small size and submucosal location. Carcinoids and endocrine cell micronests in the minor papilla occur more frequently than generally thought. It is very important to include neuroendocrine tumors of the minor papilla in the differential diagnosis of patients with recurrent pancreatitis or pancreatitis of unknown cause, especially for patients with pancreas divisum.

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31 Fluorescence-Guided Detection of Pituitary Neuroendocrine Tumor (PitNET) Tissue during Endoscopic Transsphenoidal Surgery Available Agents, Their Potential, and Technical Aspects

Vergeer RA, Theunissen REP, van Elk T, Schmidt I, Postma MR, Tamasi K, van Dijk JMC, Kuijlen JMA.Rev Endocr Metab Disord. 2022 Jun;23(3):647-657. doi: 10.1007/s11154-022-09718-9. Epub 2022 Mar 28.PMID: 35344185. Review.

Abstract

Differentiation of pituitary neuroendocrine tumor (PitNET) tissue from surrounding normal tissue during surgery is challenging. A number of fluorescent agents is available for visualization of tissue discrepancy, with the potential of improving total tumor resection. This review evaluates the availability, clinical and technical applicability of the various fluorescent agents within the field of pituitary surgery. According to PRISMA guidelines, a systematic review was performed to identify reports describing results of in vivo application of fluorescent agents. In this review, 15 publications were included. Sodium Fluorescein (FNa) was considered in two studies. The first study reported noticeable fluorescence in adenoma tissue, the second demonstrated the strongest fluorescence in non-functioning pituitary adenomas. 5-Aminolevulinic acid (5-ALA) was investigated in three studies. One study compared laser-based optical biopsy system (OBS) with photo-diagnostic filter (PD) and found that the OBS was able to detect all microadenomas, even when MRI was negative. The second study retrospectively analyzed twelve pituitary adenomas and found only one positive for fluorescence. The third investigated fifteen pituitary adenomas of which one displayed vague fluorescence. Indocyanine green (ICG) was researched in four studies with variable results. Second-Window ICG yielded no significant difference between functioning and non-functioning adenomas in one study, while a second study displayed 4 times higher fluorescence in tumor tissue than in normal tissue. In three studies, OTL38 showed potential in non-functioning pituitary adenomas. At present, evidence for fluorescent agents to benefit total resection of PitNETs is lacking. OTL38 can potentially serve as a selective fluorescent agent in non-functioning pituitary adenomas in the near future.

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32 Updated Trends in Imaging Practices for Pancreatic Neuroendocrine Tumors (PNETs): a Systematic Review and Meta-Analysis to Pave the Way for Standardization in the New Era of Big Data and Artificial Intelligence

Partouche E, Yeh R, Eche T, Rozenblum L, Carrere N, Guimbaud R, Dierickx LO, Rousseau H, Dercle L, Mokrane FZ.Front Oncol. 2021 Jul 14;11:628408. doi: 10.3389/fonc.2021.628408. eCollection 2021.PMID: 34336643.

Abstract

Purpose: Medical imaging plays a central and decisive role in guiding the management of patients with pancreatic neuroendocrine tumors (PNETs). Our aim was to synthesize all recent literature of PNETs, enabling a comparison of all imaging practices.

Conclusion: We provide an overview of the updated current trends in use of medical imaging for diagnosis and response assessment in PNETs. The most commonly used imaging modalities are anatomical (CT and MRI), followed by PET/CT and SPECT/CT. Therefore, standardization and homogenization of PNETs imaging practices is needed to aggregate data and leverage a big data approach for Artificial Intelligence purposes.95% CI, 2.0-8.7) and 2.6 (95% CI, 1.6-4.4), respectively). Thus, the treatment efficacy of ICIs for advanced/metastatic NENs varied according to primary site, tumor differentiation, and drug regimen. Poorly differentiated NENs showed a better ORR than well-differentiated NENs but had a negative impact on survival.

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33 Efficacy of Immune Checkpoint Inhibitors against Advanced or Metastatic Neuroendocrine Neoplasms: a Systematic Review and Meta-Analysis

Park EJ, Park HJ, Kim KW, Suh CH, Yoo C, Chae YK, Tirumani SH, Ramaiya NH.Cancers (Basel). 2022 Feb 4;14(3):794. doi: 10.3390/cancers14030794.PMID: 35159061. Review.

Abstract

We performed a systematic review and meta-analysis of the treatment efficacy of immune checkpoint inhibitors (ICIs) in advanced/metastatic neuroendocrine neoplasms (NENs). MEDLINE and EMBASE were searched to identify studies that provide data on treatment response and/or survival outcomes of advanced/metastatic NEN patients treated with ICIs. The overall response rate (ORR) was pooled using a random-effects model. Meta-regression was performed to explore factors influencing the ORR. Individual patient data (IPD) meta-analysis of survival was performed using stratified Cox regression. Ten studies (464 patients) were included. The overall pooled ORR was 15.5% (95% confidence interval (CI), 9.5-24.3%), and it varied according to the primary site (thoracic, 24.7%; gastro-entero-pancreatic, 9.5%), tumor differentiation (poorly differentiated, 22.7%; well-differentiated, 10.4%), and drug regimen (combination, 25.3%; monotherapy, 10.1%). All these variables significantly influenced the ORR. Tumor differentiation was associated with both overall survival and progression-free survival (hazard ratio of poorly differentiated tumors, 4.2 (95% CI, 2.0-8.7) and 2.6 (95% CI, 1.6-4.4), respectively). Thus, the treatment efficacy of ICIs for advanced/metastatic NENs varied according to primary site, tumor differentiation, and drug regimen. Poorly differentiated NENs showed a better ORR than well-differentiated NENs but had a negative impact on survival.

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34 Targeted Alpha-Particle Therapy in Neuroendocrine Neoplasms: a Systematic Review

Koh TT, Bezak E, Chan D, Cehic G.World J Nucl Med. 2021 Aug 20;20(4):329-335. doi: 10.4103/wjnm.wjnm_160_20. eCollection 2021 Oct-Dec.PMID: 35018146. Review.

Abstract

Neuroendocrine neoplasms (NENs) are a very diverse group of tumors with a worldwide rise in incidence. Systemic therapy remains the mainstay treatment for unresectable and/or metastatic NENs. 177Lu-DOTATATE, a radiopharmaceutical which emits beta particles, has emerged as a promising therapy for metastatic gastroenteropancreatic neuroendocrine neoplasms (GEP-NENs). However, limited treatment options are available particularly after the failure of 177Lu-DOTATATE therapy. This review aims to identify and summarize the available evidence for, and potential adverse events of, targeted alpha-particle therapy (TAT) in the treatment of metastatic NENs, specifically GEP-NENs. The MEDLINE, EMBASE, SCOPUS, and Cochrane Library databases were searched. Two articles which met the inclusion criteria were identified and included in the review. Putative radiopharmaceuticals that can be considered for metastatic NEN treatment include 225Actinium (225Ac)-DOTATATE and 213Bismuth (213Bi)-DOTATOC. There was evidence of partial response using both radiopharmaceutical agents without significant hematological, renal, or hepatotoxicity. Future studies should consider longer term, randomized controlled trials investigating the role of TAT, in particular, 225Ac-DOTATATE, in the treatment of metastatic NENs.

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Treatment of Advanced Gastro-Entero-Pancreatic Neuro-Endocrine Tumors: a Systematic Review and Network Meta-Analysis of Phase III Randomized Controlled Trials

Ricci C, Lamberti G, Ingaldi C, Mosconi C, Pagano N, Alberici L, Ambrosini V, Manuzzi L, Monari F, Malvi D, Rosini F, Minni F, Campana D, Casadei R.Cancers (Basel). 2021 Jan 19;13(2):358. doi: 10.3390/cancers13020358.PMID: 33561087. Review.

Abstract

Several new therapies have been approved to treat advanced gastro-entero-pancreatic neuroendocrine neoplasms (GEP-NENs) in the last twenty years. In this systematic review and meta-analysis, we searched MEDLINE, ISI Web of Science, and Scopus phase III randomized controlled trials (RCTs) comparing two or more therapies for unresectable GEP-NENs. Network metanalysis was used to overcome the multiarm problem. For each arm, we described the surface under the cumulative ranking (SUCRA) curves. The primary endpoints were progression-free survival and grade 3-4 of toxicity. We included nine studies involving a total of 2362 patients and 5 intervention arms: SSA alone, two IFN-α plus SSA, two Everolimus alone, one Everolimus plus SSA, one Sunitinib alone, one 177Lu-Dotatate plus SSA, and one Bevacizumab plus SSA. 177Lu-Dotatate plus SSA had the highest probability (99.6%) of being associated with the longest PFS. This approach was followed by Sunitinib use (64.5%), IFN-α plus SSA one (53.0%), SSA alone (46.6%), Bevacizumab plus SSA one (45.0%), and Everolimus ± SSA one (33.6%). The placebo administration had the lowest probability of being associated with the longest PFS (7.6%). Placebo or Bevacizumab use had the highest probability of being the safest (73.7% and 76.7%), followed by SSA alone (65.0%), IFN-α plus SSA (52.4%), 177Lu-Dotatate plus SSA (49.4%), and Sunitinib alone (28.8%). The Everolimus-based approach had the lowest probability of being the safest (3.9%). The best approaches were SSA alone or combined with 177Lu-Dotatate.

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Breast Cancer Imaging.
The following is a non-exhaustive bibliography of systematic reviews that are free to access, published years 2021-2024 on the field of Breast Cancer Imaging.

36 Meta-analysis and Systematic Review of the Diagnostic Value of Contrast-Enhanced Spectral Mammography for the Detection of Breast Cancer

Liu J, Xiao R, Yin H, Hu Y, Zhen S, Zhou S, Han D.BMJ Open. 2024 Sep 3;14(9):e069788. doi: 10.1136/bmjopen-2022-069788.PMID: 39231551.

Abstract

Objective: The objective is to evaluate the diagnostic effectiveness of contrast-enhanced spectral mammography (CESM) in the diagnosis of breast cancer.

Results: This meta-analysis included a total of 12 studies. According to the summary estimates for CESM in the diagnosis of breast cancer, the pooled sensitivity and specificity were 0.97 (95% CI 0.92 to 0.98) and 0.76 (95% CI 0.64 to 0.85), respectively. Positive likelihood ratio was 4.03 (95% CI 2.65 to 6.11), negative likelihood ratio was 0.05 (95% CI 0.02 to 0.09) and the diagnostic odds ratio was 89.49 (95% CI 45.78 to 174.92). Moreover, there was a 0.95 area under the curve.

Conclusions: The CESM has high sensitivity and good specificity when it comes to evaluating breast cancer, particularly in women with dense breasts. Thus, provide more information for clinical diagnosis and treatment.

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37 Diagnostic Performance of Deep Learning in Ultrasound Diagnosis of Breast Cancer: a Systematic Review

Dan Q, Xu Z, Burrows H, Bissram J, Stringer JSA, Li Y.NPJ Precis Oncol. 2024 Jan 27;8(1):21. doi: 10.1038/s41698-024-00514-z.PMID: 38280946. Review.

Abstract

Deep learning (DL) has been widely investigated in breast ultrasound (US) for distinguishing between benign and malignant breast masses. This systematic review of test diagnosis aims to examine the accuracy of DL, compared to human readers, for the diagnosis of breast cancer in the US under clinical settings. Our literature search included records from databases including PubMed, Embase, Scopus, and Cochrane Library. Test accuracy outcomes were synthesized to compare the diagnostic performance of DL and human readers as well as to evaluate the assistive role of DL to human readers. A total of 16 studies involving 9238 female participants were included. There were no prospective studies comparing the test accuracy of DL versus human readers in clinical workflows. Diagnostic test results varied across the included studies. In 14 studies employing standalone DL systems, DL showed significantly lower sensitivities in 5 studies with comparable specificities and outperformed human readers at higher specificities in another 4 studies; in the remaining studies, DL models and human readers showed equivalent test outcomes. In 12 studies that assessed assistive DL systems, no studies proved the assistive role of DL in the overall diagnostic performance of human readers. Current evidence is insufficient to conclude that DL outperforms human readers or enhances the accuracy of diagnostic breast US in a clinical setting. Standardization of study methodologies is required to improve the reproducibility and generalizability of DL research, which will aid in clinical translation and application.

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Breast Cancer Imaging

38 Diagnostic Performance of Ultrasound-Based Artificial Intelligence for Predicting Key Molecular Markers in Breast Cancer: a Systematic Review and Meta-Analysis

Fu Y, Zhou J, Li J.PLoS One. 2024 May 31;19(5):e0303669. doi: 10.1371/journal.pone.0303669. eCollection 2024.PMID: 38820391.

Abstract

Background: Breast cancer (BC) diagnosis and treatment rely heavily on molecular markers such as HER2, Ki67, PR, and ER. Currently, these markers are identified by invasive methods.

Conclusion: Our analysis indicated that AI models have a promising accuracy for predicting key molecular biomarkers' status in BC patients. We performed the quantitative analysis for HER2 and Ki67 biomarkers which yielded a moderate to high accuracy. However, studies did not provide adequate data for meta-analysis of ER and PR prediction accuracy of developed models. The overall quality of the studies was acceptable. In future research, studies need to report the results thoroughly. Also, we suggest more prospective studies from different centers.

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39 Explainable Machine Learning for Breast Cancer Diagnosis from Mammography and Ultrasound Images: a Systematic Review

Gurmessa DK, Jimma W.BMJ Health Care Inform. 2024 Feb 2;31(1):e100954. doi: 10.1136/bmjhci-2023-100954.PMID: 38307616. Review

Abstract

Background: Breast cancer is the most common disease in women. Recently, explainable artificial intelligence (XAI) approaches have been dedicated to investigate breast cancer. An overwhelming study has been done on XAI for breast cancer. Therefore, this study aims to review an XAI for breast cancer diagnosis from mammography and ultrasound (US) images. We investigated how XAI methods for breast cancer diagnosis have been evaluated, the existing ethical challenges, research gaps, the XAI used and the relation between the accuracy and explainability of algorithms.

Conclusion: XAI is not conceded to increase users' and doctors' trust in the system. For the real-world application, effective and systematic evaluation of its trustworthiness in this scenario is lacking.

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40 Misinterpretation of Raw Data: Fundamental Flaws in 'The Diagnostic Performance of CESM and CE-MRI in Evaluating the Pathological Response to Neoadjuvant Therapy in Breast Cancer: a Systematic Review and Meta-Analysis'

Savaridas S.Br J Radiol. 2023 Aug;96(1148):20210741. doi: 10.1259/bjr.20210741. Epub 2021 Nov 10.PMID: 34757825. ***No abstract available.***

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Breast Cancer Imaging

41 A Systematic Review and Meta-Analysis Comparing the Diagnostic Capability of Automated Breast Ultrasound and Contrast-Enhanced Ultrasound in Breast Cancer

Zhang H, Hu J, Meng R, Liu F, Xu F, Huang M.Front Oncol. 2024 Jan 9;13:1305545. doi: 10.3389/fonc.2023.1305545. eCollection 2023.PMID: 38264749.

Abstract

Objective: To compare the diagnostic performance of automated breast ultrasound (ABUS) and contrast-enhanced ultrasound (CEUS) in breast cancer.

Results: A total of 16 studies were included, comprising 4115 participants. The combined sensitivity of ABUS was 0.88 [95% CI (0.73-0.95)], specificity was 0.93 [95% CI (0.82-0.97)], area under the SROC curve (AUC) was 0.96 [95% CI (0.94-0.96)] and DOR was 89. The combined sensitivity of CEUS was 0.88 [95% CI (0.84-0.91)], specificity was 0.76 [95% CI (0.66-0.84)], AUC was 0.89 [95% CI (0.86-0.92)] and DOR was 24. The Deeks' funnel plot showed no existing publication bias. The prospective design, partial verification bias and blinding contributed to the heterogeneity in specificity, while no sources contributed to the heterogeneity in sensitivity. The post-test probability of ABUS in BC was 75%, and the post-test probability of CEUS in breast cancer was 48%.

Conclusion: Compared with CEUS, ABUS showed higher specificity and DOR for detecting breast cancer. ABUS is expected to further improve the accuracy of BC diagnosis.

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42 Diagnostic Accuracy of PET with Different Radiotracers versus Bone Scintigraphy for Detecting Bone Metastases of Breast Cancer: A Systematic Review and a Meta-Analysis

Zamanian M, Treglia G, Abedi I.J Imaging. 2023 Dec 8;9(12):274. doi: 10.3390/jimaging9120274.PMID: 38132692. Review.

Abstract

Due to the importance of correct and timely diagnosis of bone metastases in advanced breast cancer (BrC), we performed a meta-analysis evaluating the diagnostic accuracy of [18F]FDG, or Na[18F]F PET, PET(/CT), and (/MRI) versus [99mTc]Tc-diphosphonates bone scintigraphy (BS). The PubMed, Embase, Scopus, and Scholar electronic databases were searched. The results of the selected studies were analyzed using pooled sensitivity and specificity, diagnostic odds ratio (DOR), positive-negative likelihood ratio (LR+-LR-), and summary receiver-operating characteristic (SROC) curves. Eleven studies including 753 BrC patients were included in the meta-analysis. The patient-based pooled values of sensitivity, specificity, and area under the SROC curve (AUC) for BS (with 95% confidence interval values) were 90% (86-93), 91% (87-94), and 0.93, respectively. These indices for [18F]FDG PET(/CT) were 92% (88-95), 99% (96-100), and 0.99, respectively, and for Na[18F]F PET(/CT) were 96% (90-99), 81% (72-88), and 0.99, respectively. BS has good diagnostic performance in detecting BrC bone metastases. However, due to the higher and balanced sensitivity and specificity of [18F]FDG PET(/CT) compared to BS and Na[18F]F PET(/CT), and its advantage in evaluating extra-skeletal lesions, [18F]FDG PET(/CT) should be the preferred multimodal imaging method for evaluating bone metastases of BrC, if available.

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43 Diagnostic Accuracy of Cone-Beam Breast Computed Tomography and Head-to-Head Comparison of Digital Mammography, Magnetic Resonance Imaging and Cone-Beam Breast Computed Tomography for Breast Cancer: a Systematic Review and Meta-Analysis

Gong W, Zhu J, Hong C, Liu X, Li S, Chen Y, Zhang B, Li X.Gland Surg. 2023 Oct 30;12(10):1360-1374. doi: 10.21037/gs-23-153. Epub 2023 Oct 26.PMID: 38021193.

Abstract

Background: Cone-beam breast computed tomography (CBBCT) is a new breast imaging technique, however, CBBCT is not yet widely used, and its future application will depend on its diagnostic potential and application value. Therefore, it is of great clinical significance to systematically review and analyze the diagnostic accuracy of CBBCT for breast cancer detection in existing studies and compare it with other traditional imaging methods for the diagnosis of breast lesions.

Conclusions: This meta-analysis of CBBCT test accuracy indicated encouraging diagnostic performance. In the summary of head-to-head comparative studies, there is a tendency for CBBCT to have greater diagnostic accuracy than DM, although its diagnostic performance is marginally inferior to that of MRI. However, the meta-analysis results were derived from studies with limited sample sizes. There is a need for more extensive research in this setting.

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44 The Applications of High-Intensity Focused Ultrasound (HIFU) Ablative Therapy in the Treatment of Primary Breast Cancer: a Systematic Review

Zulkifli D, Manan HA, Yahya N, Hamid HA.Diagnostics (Basel). 2023 Aug 4;13(15):2595. doi: 10.3390/diagnostics13152595.PMID: 37568958. Review.

Abstract

Background: This study evaluates the role of high-intensity focused ultrasound (HIFU) ablative therapy in treating primary breast cancer.

Conclusions: HIFU ablation can induce tumour coagulation necrosis in localised breast cancer, with a favourable safety profile and cosmetic outcome. However, there is variable evidence of complete coagulation necrosis in the HIFU-treated tumour. Histopathological evidence of coagulation necrosis has been inconsistent, and there is no reliable radiological modality to assess coagulation necrosis confidently. Further exploration is needed to establish the accurate ablation margin with a reliable radiological modality for treatment and follow-up. HIFU therapy is currently limited to single, palpable breast tumours. More extensive and randomised clinical trials are needed to evaluate HIFU therapy for breast cancer, especially where the tumour is left in situ.

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Breast Cancer Imaging

45 Diagnostic Accuracy of Magnetic Resonance Imaging Features and Tumor-to-Nipple Distance for the Nipple-Areolar Complex Involvement of Breast Cancer: a Systematic Review and Meta-Analysis

Byon JH, Hwang S, Choi H, Choi EJ.Korean J Radiol. 2023 Aug;24(8):739-751. doi: 10.3348/kjr.2022.0846.PMID: 37500575.

Abstract

Objective: This systematic review and meta-analysis evaluated the accuracy of preoperative breast magnetic resonance imaging (MRI) features and tumor-to-nipple distance (TND) for diagnosing occult nipple-areolar complex (NAC) involvement in breast cancer.

Results: Fifteen studies (n = 4002 breast lesions) were analyzed. The pooled sensitivity and specificity (with 95% confidence intervals) for NAC involvement diagnosis were 71% (58-81) and 94% (91-96), respectively, for continuity to the NAC; 58% (45-70) and 97% (95-99), respectively, for unilateral NAC enhancement; 55% (46-64) and 83% (75-88), respectively, for NME type; and 88% (68-96) and 58% (40-75), respectively, for mass size (> 20 mm). TND had an area under the SROC curve of 0.799 for NAC involvement. A TND of 11.5 mm achieved a predetermined specificity of 85% with a sensitivity of 64%, and a TND of 12.3 mm yielded a predetermined specificity of 83% with a sensitivity of 65%.

Conclusion: Continuity to the NAC and unilateral NAC enhancement may help predict occult NAC involvement in breast cancer. To achieve the desired diagnostic performance with TND, a suitable cutoff value should be considered.

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46 Imaging Findings for Response Evaluation of Ductal Carcinoma in Situ in Breast Cancer Patients Treated with Neoadjuvant Systemic Therapy: a Systematic Review and Meta-Analysis

Ploumen RAW, de Mooij CM, Gommers S, Keymeulen KBMI, Smidt ML, van Nijnatten TJA.Eur Radiol. 2023 Aug;33(8):5423-5435. doi: 10.1007/s00330-023-09547-7. Epub 2023 Apr 5.PMID: 37020070. Review.

Abstract

Objectives: In approximately 45% of invasive breast cancer (IBC) patients treated with neoadjuvant systemic therapy (NST), ductal carcinoma in situ (DCIS) is present. Recent studies suggest response of DCIS to NST. The aim of this systematic review and meta-analysis was to summarise and examine the current literature on imaging findings for different imaging modalities evaluating DCIS response to NST. More specifically, imaging findings of DCIS pre- and post-NST, and the effect of different pathological complete response (pCR) definitions, will be evaluated on mammography, breast MRI, and contrast-enhanced mammography (CEM).

Conclusions and clinical relevance: Calcifications on mammography can remain despite complete response of DCIS, and residual DCIS does not always show enhancement on breast MRI and CEM. Moreover, pCR definition effects diagnostic performance of breast MRI. Given the lack of evidence on imaging findings of response of the DCIS component to NST, further research is demanded.

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Breast Cancer Imaging

47 The Accuracy of Ultrasound-Guided Fine-Needle Aspiration and Core Needle Biopsy in Diagnosing Axillary Lymph Nodes in Women with Breast Cancer: a Systematic Review and Meta-Analysis

Zheng H, Zhao R, Wang W, Liu X, Wang X, Wen C, Ren Y.Front Oncol. 2023 Jun 21;13:1166035. doi: 10.3389/fonc.2023.1166035. eCollection 2023.PMID: 37416528.

Abstract

Background: This study evaluates the diagnostic accuracy of ultrasound-guided fine needle aspiration (US-FNA) and core needle biopsy (US-CNB) for detecting axillary lymph nodes in women with breast cancer.

Results: A total of 22 studies involving 3,548 patients were included to evaluate the diagnostic accuracy of US-FNA and 11 studies involving 758 patients were included to evaluate the diagnostic accuracy of US-CNB in identifying axillary lymph nodes in women with breast cancer. The accuracy of US-FNA in identifying suspicious axillary lymph nodes was as follows: overall sensitivity, 79% (95% CI: 73%-84%); global specificity, 96% (95% CI: 92%-98%); overall positive likelihood ratio, 18.55 (95% CI: 10.53-32.69); overall negative likelihood ratio, 0.22 (95% CI: 0.17-0.28); DOR, 71.68 (95% CI: 37.19-138.12); and the area under the SROC curve, 0.94 (95% CI: 0.92-0.96). The accuracy of US-CNB in identifying suspicious axillary lymph nodes was as follows: overall sensitivity, 85% (95% CI: 81%-89%); global specificity, 93% (95% CI: 87%-96%); overall positive likelihood ratio, 11.88 (95% CI: 6.56-21.50); overall negative likelihood ratio, 0.16 (95% CI: 0.12-0.21); overall DOR, 66.83 (95% CI: 33.28-134.21), and the area under SROC curve 0.96 (95% CI: 0.94-0.97).

Conclusions: The results indicate that both US-FNA and US-CNB have high accuracy for suspicious axillary lymph nodes.

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48 Diagnostic Performance of Mammography and Ultrasound in Breast Cancer: a Systematic Review and Meta-Analysis

Tadesse GF, Tegaw EM, Abdisa EK.J Ultrasound. 2023 Jun;26(2):355-367. doi: 10.1007/s40477-022-00755-3. Epub 2023 Jan 25.PMID: 36696046. Review.

Abstract

Purpose: The purpose of this study was to assess the diagnostic performance of mammography (MMG) and ultrasound (US) imaging for detecting breast cancer.

Conclusions: The meta-analysis found that, US and MMG has similar diagnostic performance in detecting breast cancer on per-patient basis after corrected threshold effect. However, on a per-lesion basis US was found to have a better diagnostic accuracy than MMG.

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49 Diagnostic Value of Multiple Ultrasound Diagnostic Techniques for Axillary Lymph Node Metastases in Breast Cancer: a Systematic Analysis and Network Meta-Analysis

Li J, Wang SR, Li QL, Zhu T, Zhu PS, Chen M, Cui XW.Front Oncol. 2023 Jan 6;12:1043185. doi: 10.3389/fonc.2022.1043185. eCollection 2022.PMID: 36686798.

Abstract

Background: Early diagnosis of axillary lymph node metastasis is very important for the recurrence and prognosis of breast cancer. Currently, Lymph node biopsy is one of the important methods to detect lymph node metastasis in breast cancer, however, its invasiveness might bring complications to patients. Therefore, this study investigated the diagnostic performance of multiple ultrasound diagnostic methods for axillary lymph node metastasis of breast cancer.

Conclusion: In axillary lymph node metastasis of breast cancer, the US+CEUS combined diagnostic method showed the highest SUCRA value among the five ultrasound diagnostic methods. This study provides a theoretical basis for preoperative noninvasive evaluation of axillary lymph node metastases in breast cancer patients and clinical treatment decisions.

50 Breast-Specific Gamma Imaging: an Added Value in the Diagnosis of Breast Cancer, a Systematic Review

De Feo MS, Sidrak MMA, Conte M, Frantellizzi V, Marongiu A, De Cristofaro F, Nuvoli S, Spanu A, De Vincentis G.Cancers (Basel). 2022 Sep 23;14(19):4619. doi: 10.3390/cancers14194619.PMID: 36230540. Review.

Abstract

Purpose: Breast cancer is the most common solid tumor and the second highest cause of death in the United States. Detection and diagnosis of breast tumors includes various imaging modalities, such as mammography (MMG), ultrasound (US), and contrast-enhancement MRI. Breast-specific gamma imaging (BSGI) is an emerging tool, whereas morphological imaging has the disadvantage of a higher absorbed dose. Our aim was to assess if this imaging method is a more valuable choice in detecting breast malignant lesions compared to morphological counterparts. Conclusion: BSGI is a valuable imaging modality with similar sensitivity to MRI but higher specificity, although at the cost of higher radiation burden.

51 The Diagnostic Performance of Machine Learning-Based Radiomics of DCE-MRI in Predicting Axillary Lymph Node Metastasis in Breast Cancer: a Meta-Analysis

Zhang J, Li L, Zhe X, Tang M, Zhang X, Lei X, Zhang L.Front Oncol. 2022 Feb 4;12:799209. doi: 10.3389/fonc.2022.799209. eCollection 2022.PMID: 35186739.

Abstract

Objective: The aim of this study was to perform a meta-analysis to evaluate the diagnostic performance of machine learning(ML)-based radiomics of dynamic contrast-enhanced (DCE) magnetic resonance imaging (MRI) DCE-MRI in predicting axillary lymph node metastasis (ALNM) and sentinel lymph node metastasis(SLNM) in breast cancer.

Conclusions: ML-based radiomics of DCE-MRI has the potential to predict ALNM and SLNM accurately. The heterogeneity of the ALNM and SLNM diagnoses included between the studies is a major limitation.

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52 The Value of Contrast-Enhanced Ultrasound Enhancement Patterns for the Diagnosis of Sentinel Lymph Node Status in Breast Cancer: Systematic Review and Meta-Analysis

Niu Z, Xiao M, Ma L, Qin J, Li W, Zhang J, Zhu Q, Jiang Y.Quant Imaging Med Surg. 2022 Feb;12(2):936-948. doi: 10.21037/qims-21-416.PMID: 35111595.

Abstract

Background: The sentinel lymph node (SLN) can represent the metastasis status of axillary lymph nodes and is a prognostic factor of breast cancer. Preoperative imaging provides information for axillary surgery decision-making, and this meta-analysis evaluated the diagnostic value of contrast-enhanced ultrasound (CEUS) for SLN status in breast cancer patients.

Conclusions: A homogeneous enhancement pattern was highly suggestive of benign lymph nodes with high sensitivity. CEUS could effectively identify the SLN, and facilitate the diagnosis of its metastatic status.

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53 Factors Affecting the Value of Diffusion-Weighted Imaging for Identifying Breast Cancer Patients with Pathological Complete Response on Neoadjuvant Systemic Therapy: a Systematic Review

van der Hoogt KJJ, Schipper RJ, Winter-Warnars GA, Ter Beek LC, Loo CE, Mann RM, Beets-Tan RGH.Insights Imaging. 2021 Dec 18;12(1):187. doi: 10.1186/s13244-021-01123-1.PMID: 34921645. Review.

Abstract

This review aims to identify factors causing heterogeneity in breast DWI-MRI and their impact on its value for identifying breast cancer patients with pathological complete response (pCR) on neoadjuvant systemic therapy (NST). A search was performed on PubMed until April 2020 for studies analyzing DWI for identifying breast cancer patients with pCR on NST. Technical and clinical study aspects were extracted and assessed for variability. Twenty studies representing 1455 patients/lesions were included. The studies differed with respect to study population, treatment type, DWI acquisition technique, post-processing (e.g., mono-exponential/intravoxel incoherent motion/stretched exponential modeling), and timing of follow-up studies. For the acquisition and generation of ADC-maps, various b-value combinations were used. Approaches for drawing regions of interest on longitudinal MRIs were highly variable. Biological variability due to various molecular subtypes was usually not taken into account. Moreover, definitions of pCR varied. The individual areas under the curve for the studies range from 0.50 to 0.92. However, overlapping ranges of mean/median ADC-values at pre- and/or during and/or post-NST were found for the pCR and non-pCR groups between studies. The technical, clinical, and epidemiological heterogeneity may be causal for the observed variability in the ability of DWI to predict pCR accurately. This makes implementation of DWI for pCR prediction and evaluation based on one absolute ADC threshold for all breast cancer types undesirable. Multidisciplinary consensus and appropriate clinical study design, taking biological and therapeutic variation into account, is required for obtaining standardized, reliable, and reproducible DWI measurements for pCR/non-pCR identification.

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54 Diagnostic Efficacy of Sentinel Lymph Node in Breast Cancer Under Percutaneous Contrast-Enhanced Ultrasound: an Updated Meta-Analysis

Deng H, Lei J, Jin L, Shi H.Thorac Cancer. 2021 Nov;12(21):2849-2856. doi: 10.1111/1759-7714.14139. Epub 2021 Oct 4.PMID: 34605207.

Abstract

Background: To investigate the diagnostic efficacy of sentinel lymph nodes (SLN) in breast cancer by percutaneous contrast-enhanced ultrasound (CEUS) through pooled analysis of relevant studies published before June 2021.

Conclusions: CEUS is a noninvasive method for the detection SLN in patients of breast cancer with relative high prediction efficacy.

55 Diagnostic Role of 18F-FDG PET/MRI in the TNM Staging of Breast Cancer: a Systematic Review and Meta-Analysis

Lu XR, Qu MM, Zhai YN, Feng W, Gao Y, Lei JQ.Ann Palliat Med. 2021 Apr;10(4):4328-4337. doi: 10.21037/apm-20-2555. Epub 2021 Apr 12.PMID: 33894709.

Abstract

Background: To investigate the value of 18F-fluorodeoxyglucose positron emission tomography/magnetic resonance imaging (18F-FDG PET/MRI) in diagnosing local tumor invasion (T stage), evaluating regional lymph node involvement (N stage), and detecting distant metastasis (M stage) in breast cancer patients.

Conclusions: 18F-FDG PET/MRI demonstrates higher diagnostic value in the TNM staging of breast cancer and can serve as an effective and promising imaging biomarker for future evaluation of TNM stage in breast cancer patients.

56 Digital Breast Tomosynthesis Compared to Diagnostic Mammographic Projections (Including Magnification) among Women Recalled at Screening Mammography: a Systematic Review for the European Commission Initiative on Breast Cancer (ECIBC)

Canelo-Aybar C, Carrera L, Beltrán J, Posso M, Rigau D, Lebeau A, Gräwingholt A, Castells X, Langendam M, Pérez E, Giorgi Rossi P, Van Engen R, Parmelli E, Saz-Parkinson Z, Alonso-Coello P.Cancer Med. 2021 Apr;10(7):2191-2204. doi: 10.1002/cam4.3803. Epub 2021 Mar 5.PMID: 33675147.

Abstract

Background: Diagnostic mammography projections (DxMM) have been traditionally used in the assessment of women recalled after a suspicious screening mammogram. Digital breast tomosynthesis (DBT) reduces the tissue overlap effect, thus improving image assessment. Some studies have suggested DBT might replace DxMM with at least equivalent performance.

Conclusion: The evidence in the assessment of screen-recalled findings with DBT is sparse and of moderate certainty. DBT probably has higher sensitivity and specificity than DxMM. Women, health care providers and policymakers might value as relevant the reduction of false-positive results and related fewer invasive diagnostic procedures with DBT, without missing BC cases.