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# The Clinical Efficacy and Applications of Portable Imaging Devices in Emergency Medical Settings: A Comprehensive Review

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## Abstract

*The integration of portable imaging devices in emergency medical settings has gained attention due to their potential to enhance diagnostic efficiency and facilitate timely patient care. Initial advancements in mobile imaging technologies under the Digital Imaging and Communications in Medicine (DICOM) standard date back to 2003, yet their clinical adoption remains limited.This review synthesizes findings from various studies sourced from prominent medical databases, including PubMed, Wiley Online Library, Web of Science, and Scopus. Key search phrases related to mobile DICOM viewers were employed to gather relevant literature assessing the diagnostic efficacy of mobile devices in interpreting radiological images in emergency scenarios.Several studies highlighted that mobile device, including tablets and smartphones, can effectively display and interpret radiological images, offering diagnostic capabilities comparable to traditional PACS workstations. For instance, mobile applications significantly reduced consultation times and enhanced accessibility to imaging data. However, the European Society of Radiology cautioned against their use for primary interpretations, recommending them instead for supplementary opinions or bedside evaluations.The findings underscore the feasibility of utilizing portable imaging devices in emergency settings to improve access to diagnostic imaging and expedite clinical decision-making. Despite their advantages, ongoing concerns regarding image quality, usability, and the need for robust IT infrastructure must be addressed to facilitate broader adoption in clinical practice.*

**Keywords:** *Portable Imaging, Emergency Medicine, Diagnostic Efficacy, Mobile Devices, DICOM.*

## Introduction

The first endeavors to use mobile devices for displaying pictures under the Digital Imaging and Communications in Medicine (DICOM) standard were documented in 2003. During that period, a Compaq iPaq Pocket PC was used, including a mobile application founded on a hypertext transfer protocol (HTTP) server known as "Cyclops PDA DICOM Editor." This system facilitated remote access to patient data and, importantly, the display of diagnostic images, including computed tomography (CT), ultrasonography (US),

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and magnetic resonance imaging (MRI) [1]. On 7 June 2011, the World Health Organization (WHO) released a statement about technology solutions, identifying mobile devices as a possible answer for remote medical consultations [2]. The advancement of information technology, digitalization, the Internet, and enhancements in network architecture have facilitated the transmission of radiological images across hospitals [3].

Despite technical advancements and the growing use of mobile devices like tablets and smartphones, they have not yet become essential tools in diagnostic imaging. Numerous mobile apps are developed to show and manipulate radiological images; however, many are designated as "not for diagnostic use," with just a select few used in clinical settings [4]. Nonetheless, mobile devices have emerged as the primary mode of communication among medical personnel in recent years. A survey conducted by Nerminathan et al. revealed that among 109 physicians, 91% had smartphones, and 88% reported frequent use of mobile devices in clinical practice [5]. Furthermore, a significant majority of physicians (85.5%) expressed readiness and need to integrate mobile devices into medical practice nationwide, while 91.1% affirmed their provision of assistance in daily operations [6].

Mobile devices provide the function of sharing medical data; they are used for the viewing and transmission of radiological images, typically over considerable distances, hence facilitating consultations among practitioners. Their computational capacity enables the transport, manipulation, and analysis of radiological tests. The European Society of Radiology (ESR) advises against the use of mobile devices for primary interpretation, highlighting its suitability for obtaining supplementary opinions or for usage at the patient's bedside [7].

In emergencies, rapid access to imaging testing is essential for the treatment procedure. Consequently, it is essential to develop systems that facilitate the viewing and manipulation of imaging studies via readily available mobile devices. Certain studies indicate the successful use of apps to enhance diagnostic and decision-making processes, particularly in the operating theatre [8]. Cewe et al. demonstrated that the time required for a remote radiological consultation using mobile devices is significantly reduced compared to conventional description stations employing the Picture Archiving and Communication System (PACS) [9]. A comprehensive assessment of scientific literature was conducted using publically accessible medical resources, including PubMed, Online Wiley Library, Web of Science, and Scopus, to evaluate the efficacy of mobile solutions designed for radiological research.

## Methods

Articles for this study were sourced from public medical resources, including PubMed, Online Wiley Library, Web of Science, and Scopus. MeSH phrases "dicom viewer phone," "dicom tablet viewer," "dicom smartphone viewer," "mobile dicom viewer," "mobile dicom reader," "dicom phone reader," "dicom smartphone reader," and "dicom tablet reader" were inputted into each of the aforementioned databases.

*The Diagnostic Efficacy of a Mobile Browser in Interpreting Abdominal Computed Tomography Scans*

Choudhri et al. evaluated the diagnostic efficacy of a mobile browser in interpreting abdominal computed tomography scans. The research aimed to ascertain the feasibility of the first diagnosis and categorization of dissecting aneurysm, aortic rupture, intramural hematoma, measurement of aortic dimensions, detection of mediastinal hematoma, aortic arch variations, and pulmonary diseases [13]. De Maio et al. assessed and contrasted the diagnostic efficacy of handheld mobile devices with a traditional PACS workstation for the interpretation of knee MRI data. The sensitivity and specificity of test findings from both device types were compared [14].

Abboud et al. sought to evaluate the repeatability of identifying pulmonary TB lesions on an iPad 2 using Osirix HD software in comparison to a traditional workstation equipped with a liquid crystal display [15]. Carrasco et al. evaluated the diagnostic precision of a PACS, a consumer-grade monitor, a laptop, and a tablet in executing linear height and breadth measurements for designated dental implant insertion locations in the posterior maxilla and mandible. The visualization quality of the associated anatomical features was

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investigated, along with the evaluation of trabecular bone and its proper architecture, while preserving optimal picture quality. The objective was to determine which of the aforementioned gadgets would be the most advantageous in clinical practice. A total of 32 computed tomography exams underwent this assessment. Furthermore, the subjective experiences of PACS and iPad users were evaluated using a brief questionnaire [16].

The objective of the study conducted by Vetter et al. was to determine whether tablets can expedite the search for radiological pictures, including whole studies, series of photographs, and individual DICOM files. The research was performed with doctors who were requested to provide a second opinion on the imaging test outcomes of patients at a trauma center. Accessibility to pictures and their frequency of use in daily work were evaluated based on a concise, unique questionnaire [17]. Whitaker et al. evaluated the precision of limb deformation measures using the Bone Ninja app in comparison to PACS. The intra- and inter-observer variability among various orthopedic practitioners was also assessed [18]. Research by Brehm et al. evaluated mRay performance on two mobile devices and compared it to a GE PACS workstation. Authors assessed the adequacy of software quality for evaluating computed tomography in patients with suspected stroke [19].

De Maio et al. conducted a comparison of magnetic resonance imaging (MRI) assessments of knee joints using a mobile device vs a conventional PACS station. The mobile device used in the research was an iPhone 3GS, operating on iOS 4.0, with a screen diagonal of 8.9 cm and a display resolution of 320 × 480 pixels. The mobile device used OsiriX DICOM reader, version 1.1.4. A second device was a Hewlett-Packard Z800 workstation, operating on Windows XP Professional 2002 Service Pack 3, coupled to an HP LP3065 monitor with a diagonal screen measurement of 76.2 cm and a resolution of 2560 × 1600 pixels. The eFilm Workstation 3.0 software was used to display pictures on the workstation. The examination pictures were acquired utilizing a 1.5-T MRI scanner, Signa Excite, software version 12.0, equipped with a multichannel coil specifically designed for the knee joint. Examinations were conducted using the usual knee MRI technique. The layer was 4 mm in thickness, and the field of vision was 14 x 14 cm. The evaluations were conducted by two radiologists with extensive competence in detecting musculoskeletal illnesses using MRI scans. Researchers conducted their study separately, using a blinded and randomized approach. Examinations were presented randomly. The first researcher evaluated all 50 photographs. The second researcher, to establish trustworthiness, detailed 25 randomly chosen papers from the whole pool of assessed studies. To minimize the potential of result distortion from researchers recalling previously analyzed tests, the gap between interpreting the identical test on the mobile device and the PACS station was no less than two months. A report detailing the examination was written using the normal protocol used by the orthopedic physician, and the duration required for the examination was recorded, rounded to the closest minute [14].

Abboud et al. conducted a comparative analysis of two devices: an iPad2 featuring a 9.7-inch diagonal screen with a resolution of 1024 × 768 pixels, a maximum brightness of 410 cd/m², and a contrast ratio of 962:1, alongside an iMac LCD monitor with a 17-inch diagonal screen, a resolution of 2560 × 768 pixels, a maximum brightness of 375 cd/m², and a default contrast ratio of 1000:1. The DICOM image viewer for the iMac used OsiriX Dicom, while the iPad 2 utilized OsiriX HD. The research included a dataset of 240 chest X-rays from the TB screening initiative. Out of these 240 instances, 200 were initially reported as negative, whereas 40 were positive. All studies were anonymised and arranged for interpretation in a random sequence. A panel of five radiologists examined the examinations to determine the binary presence (positive or negative) of radiological characteristics indicative of TB. The first equipment for assessing diagnostic pictures was randomly chosen for each researcher. After a minimum of one week, researchers evaluated photographs on the secondary device. The measurements were conducted under comparable illumination circumstances in the same room [15].

*The Diagnostic Efficacy of The Mray Image Viewing Software*

Carrasco et al. used the following devices and software for interpreting CT scans. Operators were to assess 32 CBCT (Cone Beam Computed Tomography) images produced with the Hitachi CB MercuRay, according to the usual departmental procedure of 120 KV and 15 mA. The photos were anonymised and assigned

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random numbers before examination. DICOM data were transferred to the study's target devices via an external storage device. The data were then entered into the program (CB-Works, OsiriX). The PACS monitor served as the benchmark standard. The iPad 4 was linked to a MacBook across a wireless network using a remote desktop program (Pocket Cloud). Furthermore, the iPad and pen were encased in a transparent plastic sheet to replicate the sterile conditions of the operating theater. The photos were examined and evaluated by operators under controlled lighting and auditory settings. Images shown on a tablet using the OsiriX application were examined in a room illuminated by fluorescent lights to replicate the environment of a dental clinic. The operators used the tools supplied by the programs, including magnification, contrast adjustment, cross-sectional cutting tools, and length measuring instruments. The area of focus was the edentulous regions of the mandible and maxilla around the molars and premolars. The research participants assessed the diagnostic quality of the devices by quantitative and qualitative measurements, additional qualitative assessments, and the device resolution necessary for pathology determination [16].

The Ortho Mobile research conducted by Vetter et al. examines the use of mobile devices and specialized software by orthopedists for the interpretation of radiological images in clinical environments. An iPad mini 2 tablet was used for its adequate screen size to assess imaging tests while being compact enough to fit in an apron pocket. The program was chosen based on its offline functionality. The function of message exchange via a messenger was also observed. The chosen program, mRay, was developed for the purpose of reading and analyzing DICOM format pictures on mobile devices. The software comprises the application (client component) and the application server. The application server's function is to extract data from the PACS database, encrypt it, and compress it. Subsequently, this data is sent to the mobile device, allowing for offline viewing post-download. The mRay application is a CE-certified medical device. The communication platform included into the program facilitates the exchange of text and voice communications, as well as the sharing of DICOM pictures or their segments among users. Physicians included in the research received training on use the program. The device's operational performance were documented by a daily online questionnaire [17].

Whitaker et al. evaluated the use and accuracy of PACS and Bone Ninja mobile apps for measuring limb deformities. Four evaluators with varying levels of expertise (an attending orthopaedic surgeon, a senior orthopaedic resident, a junior orthopaedic resident, and an orthopaedic physician assistant) assessed each image (48 limb images of 24 patients) on four separate occasions (twice using the Bone Ninja application and twice on PACS), ensuring a minimum one-week interval between measurements and alternating between PACS and Bone Ninja. All evaluators were provided with comprehensive instructions for conducting measurements on both devices. The timing of their assessment was recorded at their most recent review [18].

Brehm et al. assessed the diagnostic efficacy of the mRay image viewing software in comparison to a traditional radiography workstation. An experienced neuroradiologist with over five years of experience and a resident with more than one year of experience evaluated the anonymized cases of 50 patients, each with multiple images, independently on two handheld devices utilizing mRay Software, as well as on a GE PACS workstation. Both reviewers were instructed to examine the photographs in an environment with ambient illumination not exceeding 100 lux. Both doctors were requested to assess the diagnostic efficacy of all three devices using a five-point ordinal scale, focusing on the identification of large-vessel occlusion (LVO), intracranial hemorrhage (ICH), early ischemia indicators, and the overall safety of the diagnosis [19].

*Outcomes of Included Articles*

Choudhri et al. conducted research in which aortic pathology was accurately detected on mobile devices in all 9 out of 9 abnormal cases among 15 examined studies. Furthermore, all non-pathological tests (6/6) were accurately categorized. Additional anomalies, including mediastinal hematomas, pneumothorax, and aortic arch involvement, were also accurately noted. Abnormal aortic arch configurations, including bovine-type arch and left vertebral arteries arising between the left common carotid and left subclavian arteries, were also seen. One researcher failed to identify one of these anomalies on a single occasion. In individuals

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with aortic diseases, the diameters of these conditions were assessed. The authors assert that the diagnosis derived from DICOM pictures on a mobile device is equivalent to the evaluation conducted after seeing the identical images on the PACS workstation. The authors felt that a bigger screen may serve as a "valuable tool" [13].

De Maio et al. conducted imaging exams on all 50 patients. These patients had knee MRI and then underwent knee arthroscopy between January 1, 2009, and December 31, 2009. In 50% of instances, the predominant explanation was meniscal injury, whereas in 24%, it was anterior cruciate ligament injury. The iPhone assessments demonstrated strong specificity (ranging from 74% for cartilage to 100% for PCL) and sensitivity (ranging from 77% for the lateral meniscus to 100% for ACL). Observations conducted on conventional workstations shown comparable high sensitivity and specificity, with specificity ranging from 84% for cartilage to 100% for PCL, and sensitivity varying from 82% for the lateral meniscus to 100% for ACL. The distinction between the two reading kinds was the time required to complete them, with a mean difference of 3.98 minutes. A prolonged duration was required for the evaluation of photos on the iPhone [14].

Abboud et al. contrasted the LCD monitor (27-inch diagonal) with the iPad display (9.7-inch diagonal) while screening for TB in 240 individuals. Cohen's Kappa study for five researchers and two displays indicated that the results are either excellent (>0.8) or very good (>0.79), depending upon the researchers' professional expertise. All researchers agreed that the examination of radiographic images on the smaller screen of the mobile device was less efficient than on the LCD. Nonetheless, this just impacted the comfort of labor and did not influence the understanding of the picture itself. The research findings unequivocally demonstrate that tablets are effective for radiological diagnosis of TB, comparable to consumer LCD monitors, with a generalized Cohen's $\varkappa$ of 0.865 ($z = 15.7$) for the iPad and 0.817 ($z = 14.8$) for the LCD display in various evaluations. Compliance in diagnosing LCD monitors and tablets attained 90%, with a higher rate of 94% for instances categorized as negative compared to those classified as positive. Nevertheless, the authors advise against using mobile devices for standard tests. Their study does not permit the detection of other lung disorders, particularly those marked by subtle, hardly perceptible alterations [15].

Carrasco et al. got data that unequivocally demonstrate the great compliance of the measures across all used devices, including the tablet. The ICC values demonstrated substantial dependability. The measurements conducted a second time shown more compliance than the first ones, and the technical specifications of all evaluated monitors facilitated the acquisition of consistent findings. The authors assert that the diagnostic quality of the tests, as well as the visualization of particular sites and the cancellous bone, were equivalent in the evaluation process across both devices throughout both assessment sessions. The exception pertains to the measurement of the inferior alveolar nerve canal (IAC), which exhibits a variance of one. For the IAC measurements, a Kappa statistic was computed, yielding a value of 0.9130 and a corresponding p-value of less than 0.0001. These findings demonstrate strong intraoperator consistency. Furthermore, the study's authors requested doctors to fill out a brief questionnaire evaluating their subjective experiences with various gadgets and programs. The poll findings unequivocally demonstrate the near-total lack of subjective disparities in the quality of use between the iPad and PACS, highlighting the tablet's mobility as its primary benefit. In the mobility assessment, the iPad scored 5 points, whereas PACS obtained just 1 point on a scale of 1 to 5. Regarding user comfort, picture viewing speed, and ease of manipulation, the iPad received 4 points, whereas PACS obtained 5 points in each of the aforementioned survey criteria. The authors assert that the iPad is further characterized by its competitive pricing, portability, and potential for intraoperative use, hence reducing the danger of infections for patients and enhancing the efficiency of implantologists [16].

Vetter et al. demonstrated that the examination of radiological pictures on tablets constituted, on average, less than 30% of the daily evaluated images. Furthermore, mobile devices were used an average of 1.1 times daily for bedside demonstrations. The access time measurements for diagnostic pictures indicate that the mobile device is almost twice as quick as the desktop PC, with times of 1 minute and 2.2 minutes, respectively. The average difference in these data, as calculated by the linear mixed effects model, was 1.1 minutes in favor of mobile device access. The tablet was used in around 29% of the 425 consultation requests, yielding an average of 1.7 each day. Reanalysis of a research on a desktop computer was required in just 0.2% of instances owing to inadequate visibility on a mobile device. The authors encountered concerns about difficulties in connecting to the WiFi network, which hindered their work; nonetheless, it is important to highlight that the mobile device was used throughout the hospital, including the ward, operating room, and emergency department [17].

In the publication by Whitaker et al., all four doctors who assessed LL, LDFA, and MPTA of 24 patients using both devices had high correlation, both intra-observer and inter-observer, as shown by Cohen's kappa. No substantial changes were seen in leg length discrepancy (LLD), MPTA, or LDFA measures between Bone Ninja and PACS. The intra-observer, intra-class correlation coefficient (ICC) for the measures was comparable for the Bone Ninja and PACS apps. The ICC among the observers was comparable between the mobile application and the traditional descriptive station, with values of 0.95, 0.96, and 0.99 vs 0.99, 0.98, and 0.98, respectively. The accuracy of length measurements for the right and left lower limbs was examined, revealing no significant difference between them, whether using PACS or Bone Ninja ($p = 0.526$). Furthermore, physicians evaluating radiographic images found the Bone Ninja mobile application to be more user-friendly and efficient than the traditional descriptive station, as evidenced by the time measurements (an average of 3 minutes and 43 seconds per image for Bone Ninja compared to 4 minutes and 51 seconds for PACS) [18].

Research by Brehm et al. showed that both the senior neuroradiologist and the resident accurately detected all large vessel occlusions, intracranial tumors, and intracerebral hemorrhages on both mobile devices and PACS. An experienced physician exhibited three variations in the selection of the LVO (large vessel occlusion) site. He identified 12 severe stenoses, whereas the resident identified 14 severe stenoses (4 vertebral arteries and 10 internal carotid arteries). In the assessment of CCT (cranial computed tomography) and CBV (cerebral blood volume) using ASPECTS (Alberta Stroke Program Early Computed Tomography Score), both investigators attained a median score of 10 across all three devices, with no statistically significant difference observed between the evaluations of the two specialists. The sensitivity of CBV/CBF (cerebral blood flow) mismatch detection for a senior neuroradiologist was 84.2% for MED-TAB and 88.2% for iPhone 7 Plus, however for a resident it was 85.0% for both devices. The specificity was 91.3% for MED-TAB and 90.9% for iPhone 7 Plus as evaluated by a senior neuroradiologist, and 84.2% and 83.3% respectively as reviewed by the resident.

Both intracranial tumors seen in patients were accurately recognized by both physicians using all three technologies. Both professionals with high confidence excluded intracranial bleeding (ICH) using mobile devices, assessing their diagnostic value as "adequate" in 97.8% of instances and as "excellent" in 82.4% of instances. An experienced neuroradiologist indicates that early indications of cerebral ischemia may be recognized in 94% of instances using mobile devices and in 98% of cases using GE PACS; however, the difference is not statistically significant ($p = 0.946$ and $p = 0.112$). The resident identified them using GE PACS in 92% of instances, MED-TAB in 96% ($p = 0.699$), and in 95% using the iPhone 7 Plus ($p = 0.893$). The senior physician assessed both mobile devices and the GE PACS system as adequate for diagnosis in every instance. The resident assessed MED-TAB as adequate for diagnosis in 96%, iPhone 7 Plus in 94%, and GE PACS in 98%, with no statistically significant differences ($p = 0.181$ and $p = 0.956$) [19].

## Discussion

All publications in this review emphasize the need for mobile apps associated with radiological tests to be user-friendly and intuitive. Simultaneously, they must not be inferior to conventional diagnostic instruments for the range of potential picture alterations [20-26]. Shih et al. asserted that the interface significantly impacts device use, affecting performance, discoverability, and usage frequency [21]. Furthermore, Whitaker et al. indicated that measuring anatomical features on a mobile device using the Bone Ninja program was more expedient than using PACS [18]. Vetter et al. highlighted that the duration for accessing an image on a mobile device (using mRay—1.1 minutes) was much less than that of the PACS workstation (2.2 minutes). This example demonstrates the advantages of mobile systems regarding the time required to launch an application—employing tablets considerably streamlines doctors' productivity. Images may be reviewed

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immediately upon transmission to the mobile device; but, to use PACS, the physician must first go to the PACS location [17]. Furthermore, Jenei et al. assert that radiological pictures on mobile devices are universally accessible, providing a more expedient option than the PACS workstation, particularly in urgent situations [22].

Diagnosis using DICOM images on a mobile device may achieve substantial concordance as compared to PACS description workstations [27-34]. McEntee et al. examined the efficacy of using an iPad for the assessment of chest X-rays in identifying lung nodules. The benchmark was the LCD display used in PACS stations. The interpretation of 30 pictures by eight radiology professionals showed similar efficacy for both modalities [24].

## Conclusions

For a program to be used consistently, its functionality must be straightforward and user-friendly—one of the key criteria is the interface. The unequivocal benefit of the mobile application is its absence of location constraints, applicable in both hospital settings (including the operation room) and external environments. This capability is very helpful in emergency scenarios. The devices must be well protected, such as with transparent plastic film, to ensure their usage in environments necessitating total asepsis. The availability of a mobile device with the user enhances communication between the user and the secondary physician. For mobile applications to be utilized by physicians in a professional setting, they must demonstrate a sufficiently high quality in analyzing radiological examinations (the most frequently cited factor being screen size) and should facilitate diagnosis and the execution of appropriate therapeutic interventions. Mobile devices must be compatible with the IT systems used in medical institutions, which should possess a sufficiently efficient network infrastructure. A primary issue may be an inadequate or intermittent internet connection; nevertheless, this aspect is likely to enhance in the future. No relevant legal laws currently exist that explicitly delineate the requirements for using the aforementioned apps and technologies in the diagnostic and treatment processes.

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الفعالية السريرية وتطبيقات أجهزة التصوير المحمولة في البيئات الطبية الطارئة: مراجعة شاملة

الملخص

الخلفية :حظي دمج أجهزة التصوير المحمولة في البيئات الطبية الطارئة باهتمام متزايد نظرًا لإمكاناتها في تعزيز كفاءة التشخيص وتسهيل رعاية المرضى في الوقت المناسب. تعود أولى التطورات في تقنيات التصوير المحمول ضمن معيار التصوير الرقمي والاتصالات في الطب (DICOM) إلى عام 2003، ومع ذلك، لا يزال اعتمادها السريري محدودًا.

المنهجية :تجمع هذه المراجعة النتائج من دراسات مختلفة تم الحصول عليها من قواعد بيانات طبية بارزة، بما في ذلكPubMed ، Wiley Online Library، Web of Science، و .Scopusتم استخدام عبارات بحث رئيسية متعلقة بعرض الصور الطبية على الأجهزة المحمولة لجمع الأدبيات التي تقيم الفعالية التشخيصية للأجهزة المحمولة في تفسير الصور الإشعاعية في السيناريوهات الطارئة.

النتائج :أشارت العديد من الدراسات إلى أن الأجهزة المحمولة، بما في ذلك الأجهزة اللوحية والهواتف الذكية، يمكنها عرض وتفسير الصور الإشعاعية بشكل فعال، مما يوفر قدرات تشخيصية قابلة للمقارنة بمحطات عمل أنظمة أرشفة الصور والاتصالات (PACS)

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التقليدية. على سبيل المثال، ساعدت التطبيقات المحمولة في تقليل أوقات الاستشارة بشكل كبير وتعزيز الوصول إلى بيانات التصوير. ومع ذلك، حذرت الجمعية الأوروبية لطب الأشعة من استخدامها للتفسيرات الأولية، وأوصت باستخدامها فقط للحصول على آراء إضافية أو التقييمات بجانب السرير.

الخلاصة :تؤكد النتائج جدوى استخدام أجهزة التصوير المحمولة في البيئات الطارئة لتحسين الوصول إلى التصوير التشخيصي وتسريع اتخاذ القرارات السريرية. على الرغم من مزاياها، لا تزال هناك مخاوف مستمرة بشأن جودة الصور، وقابلية الاستخدام، والحاجة إلى بنية تحتية قوية لتكنولوجيا المعلومات يجب معالجتها لتسهيل الاعتماد الأوسع في الممارسات السريرية.

الكلمات المفتاحية :التصوير المحمول، الطب الطارئ، الفعالية التشخيصية، الأجهزة المحمولة، DICOM