Is there a difference in reading time when normal and abnormal DBT cases are examined by DBT experienced radiologists?

(Poster)

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Introduction

Digital Breast Tomsynthesis has been proven to be superior to 2D mammography in many aspects. However, it is still under investigation whether it is cost-effective to implement DBT into breast screening programmes. It was reported by previous studies that the DBT reading time is normally twice as long as reading traditional 2D mammography (Skane, et al., 2013). Whilst DBT screening has been implemented in Italy for over 7 years and proven to be feasible (Bernardi, et al., 2017). The Italian radiologists have taken part in the breast screening programme and managed to cope with the workload and deliver reliable diagnostic accuracy at the same time. Examining the visual search behaviour from experienced DBT screening radiologists may reveal insight into the most effective DBT interpreting strategy and help DBT trainers improve their skills. In this study, seven experienced DBT radiologists from the Italian screening programme were invited to take part in an observer performance study while their visual search behaviour data were collected and analysed to explore the potential optimized DBT interpretation pattern.

Method

Two sets of 2D digital breast tomosynthesis cases comprising normal, benign and malignant appearances were collected as the test case set. All the cases have prior images and consist of both 2D or C-view together with DBT images. The case set were pre-loaded to the Hologic DBT Selenia workstation and shuffled in random order. The Smart Eye remote eye tracker was configured underneath the DBT workstation to record participants’ eye movements and a scene camera was fixed on top of the monitor to track participants’ hand movements during the experiment (Figure 1). Before participants started examining the cases, they were briefed with an information sheet telling them to view a set of twenty DBT cases and the task was detecting the abnormal lesions and report the details of any features. Then the participant was instructed to calibrate the eye tracking system through a 4-point calibration process.

Results

Results show that excluding any reporting time, an average of 65 seconds of reading time was spent on each case across 7 participants. On average, they spent 14 seconds reading the initial 2D overview and then 51 seconds examining the DBT view (Figure 2 a). The reading time was significantly longer for examining DBT than 2D view (p=0.001). When comparing reading time between normal and abnormal cases, participants spent slightly less time reading a normal case (63s) than abnormal case (67s) as shown on Figure 2 b. However, the result is not significant (p=0.53). Additionally little difference was spotted in reading time for the 2D overview between normal (15s) and abnormal cases (13s, p=0.1335) also for the DBT view (normal: 48s; abnormal: 54s, p=0.3411).

Conclusion

How to reduce the examining time is the key challenge to implement DBT into a breast screening programme. It was hoped that faster reading speed on normal images which take up the majority of the screening cases would be shown by the experienced DBT readers. However, the results in this study did not show much significance. Examination of visual search behaviour from experienced DBT screening radiologist may reveal an insight of how experts read DBT cases. This may help DBT trainers to learn a more effective reading strategy. More experiments and analyses are currently ongoing to investigate this problem.

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Reference
