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Implementation of AI Structured Reporting to Smooth Workflow in Radiology Department Daily Practice

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Purpose

- To evaluate the workflow of structured reporting with integration of AI in routine radiology practice.

Workflow of structured reporting

- Since Sep. 2016, structured reporting has been used in radiology department.

Workflow of structured reporting

During reporting, the radiologists performed the following procedures to complete a report

- Open the structured reporting software interface from the Patient List of RIS.
- Click to choose the icons for a finding, or select from a drop-down menu to define the image features that was detected.
- Type in the editing boxes to input the measurements of the observation, such as diameters and CT values.
- Capture a screen snapshot for the significant finding and save it as the key image.
- Input the final diagnosis and submit the report.

Workflow of structured reporting + AI

- Since April 2018, AI algorithms were integrated to the workflow of structured reporting.
- Some reporting sections were generated automatically by AI, including
  - Selection of the findings
  - Input of the measurements
  - Capture of the key images
  - Determine of the final diagnosis

Workflow of structured reporting + AI

During reporting, the radiologists performed the following procedures to complete a report

Open the structured reporting software interface from the Patient List of RIS.

Check the contents that had already completed by AI, revise it when needed.

Check the final diagnosis and submit the report.

Study of the quality improvement by the AI workflow

- The acceptance rate of AI results was evaluated from the log file of the software.
- The average interpretation and reporting time was calculated for the whole institute.
- Questionnaire survey was collected to evaluate the experiences of the radiologists in the new workflow.

Result 1

- The following reports were almost fully automatically generated by AI
  - Chest X ray
  - Plain head CT
  - Prostate mpMRI
- The following reports were partially automatically generated by AI
  - LI-RADS reports of CT and MR
  - BI-RADS report of mammography
  - TNM report of RCC
  - CT report of renal stone
  - CT report of renal cyst

Result 2

- The acceptance rate of AI results was
  - 84.3%-100% for detection the image features and the key images
  - 93.5%-100% for measurements of diameters and CT values
  - 40.1-78.3% for the final diagnosis.
  - Specifically, in 15.4-36.8% cases, the reports were totally generated by AI and accepted by the radiology without change of one word.
- The average interpretation and reporting time reduced 8.9%-56.1%.
- In questionnaire survey, 96.9% radiologists considered the workflow of structured reporting with integration of AI was better than the traditional reporting workflow.

Conclusion

- The workflow of structured reporting with integration of AI in routine practice can be well accepted by the radiologist.