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Evaluating the Economic and Clinical Implications of AI-Assisted Triage for Intracranial Aneurysms

Ochsner Health

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Background and Purpose

- AI-assisted triage may improve intracranial aneurysm (IA) detection within radiology workflows
- The financial implications of AI adoption are important for hospitals and health systems
- This study evaluated enhanced detection and modeled downstream imaging, intervention, and revenue

Study Design and Cohort

- Retrospective analysis of **2,466 consecutive adult CTA examinations**
- Study period: November 2023-April 2024
- Conducted within a large, integrated healthcare system
- Radiologists did not have access to AI results during initial interpretation

AI Analysis and Case Adjudication

- Radiology report diagnoses were extracted using a natural language processing algorithm
- A commercially available, FDA-cleared AI algorithm (Aidoc, New York, NY, USA) analyzed all CTA examinations for presence of intracranial aneurysm
- Cases reported as negative but flagged positive by AI were reviewed by two interventional neuroradiologists
- Confirmed cases were classified as **enhanced detection cases**

Economic Model

- Care pathways were stratified by aneurysm size: 2-5 mm and ≥5 mm
- Downstream impact included cerebral angiography, magnetic resonance angiography, and intervention
- Revenue estimates were based on MS-DRG and CPT reimbursement estimates
- The model estimated potential downstream impact rather than directly observed revenue

AI Identified 22 Additional True Positive Aneurysms

54 Initial radiologist interpretation identified 54 positive IA cases

29 AI flagged 29 additional cases

22 Adjudication confirmed 22 additional true positive aneurysms

40.7%

Enhanced detection rate: 40.7% (22/54)

Annualized Modeling Projected 53 Previously Overlooked Cases

2,466
observed CTA examinations

→

5,918
annualized CTA examinations

Observed volume was annualized from 2,466 to 5,918 CTA examinations

Projected annual total: 182 positive aneurysm cases

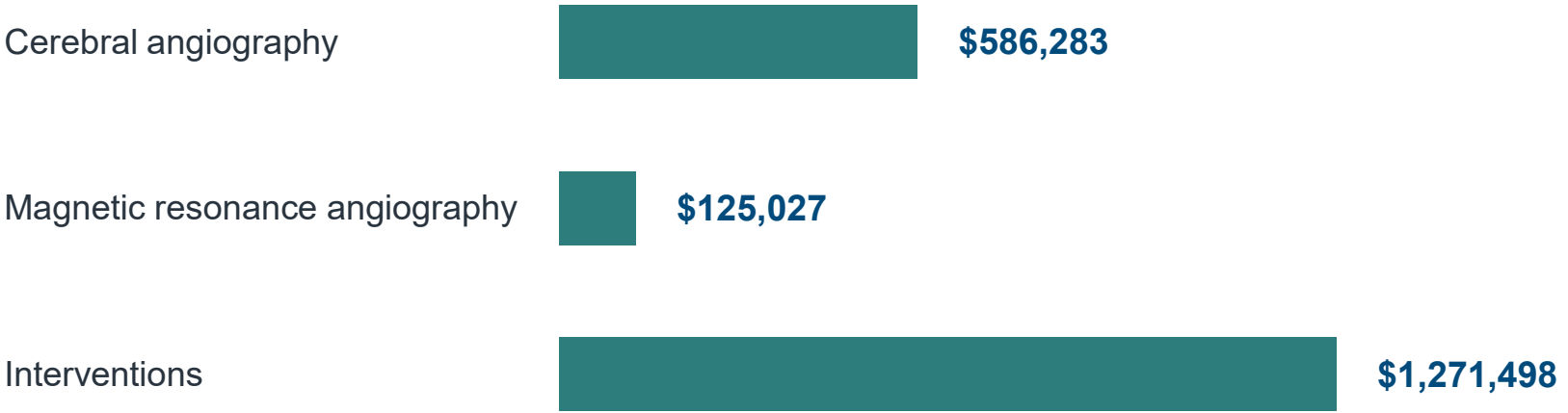


- Projected annual radiologist-identified cases: 129
- Projected annual cases initially overlooked but identified by AI: 53

Enhanced Detection Was Associated With Downstream Care

- The 53 annualized overlooked patients were mapped to modeled care pathways
- Projected downstream utilization included:
  - 103 cerebral angiograms
  - 112 magnetic resonance angiograms
  - 41 interventions
- Pathways were based on aneurysm size and anticipated medically appropriate care

Modeled Annualized Downstream Revenue Totaled $1.98 Million



Total estimated annualized downstream revenue **$1,982,808**

Clinical and Economic Interpretation

- AI-assisted triage enabled additional detection of intracranial aneurysms
- Enhanced detection was associated with modeled downstream imaging and intervention
- The analysis demonstrated a measurable budget impact signal related to appropriate care pathways
- Potential additional value from rupture avoidance, workflow efficiency, and reduced diagnostic risk was not quantified

Limitations

- Retrospective analysis from one large, integrated healthcare system
- Annualized volumes were extrapolated from the observed study period
- Revenue estimates depended on modeled care pathways and MS-DRG/CPT assumptions
- Actual care, payer mix, reimbursement, and institutional practice patterns may differ
- Rupture prevention and workflow outcomes were outside the scope of this analysis

Conclusion

- AI-assisted triage identified 22 additional true-positive aneurysms among 2,466 CTA examinations
- Enhanced detection was 40.7% relative to the 54 cases identified initially
- Annualized modeling projected 53 previously overlooked cases and $1.98 million in downstream revenue
- Clinical and economic outcomes should be considered together when evaluating AI-assisted aneurysm triage

References

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