Cardiac MRI waiting list backlog reduction with rapid scanning and AI-enabled reporting

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Background

NHS target: 30% increase in elective activity to ease waiting lists

Innovative digital solutions needed to achieve this

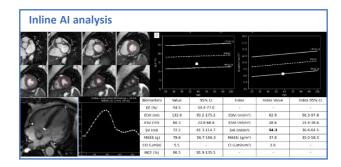
Cardiac MRI is a key investigation in cardiovascular medicine, but it is time-consuming:

- 1 hour slot to scan each patient
- •+ 20 minutes to analyse images and produce a report

Objectives

Use rapid scanning protocols, combined with AI to:

- •Increase throughput of cardiac MRI
- •reducing waiting lists
- •improve cost-effectiveness





Methods

Recruited 215 patients, allocated to:

- n=85 for standard protocol
- n=130 for rapid protocol with AI

Use fully automated and clinically validated AI tools for functional analysis and perfusion mapping ^{2,3}

Rapid		Conventional
Localizers		Localizers
Initial localizers		Initial localizers
Stack of bright blood bSSFP images	3.48	Stack of bright blood bSSFP images
Cardiac localizers: 2-chamber, 5 slice	外國主員	Cardiac localizers: 2-chamber, 5 slice
SAX		SAX
CINE		CINE
4 and 3 chamber cine pre stress		4 ch cine
4 and 3 chamber the pre stress		3 ch cine
		2ch cine
	· · · · · · · · · · · · · · · · · · ·	LVOT/aortic valve
Stress perfusion imaging 2 nd dose of gad after the stress	0.0	Stress perfusion imaging
Cine post stress		Cine post stress SAX
SAX		LVOT
LVOT		5.75
Aortic valve	200 D	Rest perfusion imaging
		nan
EGE	19 5 8	EGE
LGE	35.6.13	LGE
	1	
Compare	ed to the convention	al protocol:
•	Removed:	72
	Black blood stack	
	Rest perfusion	
	Moved after stres	S
	Cine 2ch and LVOT/a	orta

Results				
	Standard Protocol	Rapid Protocol with Al		
Scanning Time (minutes)	36 [24-52]	23 [14-31]	P<0.001	
Reporting Time (minutes)	21 [5-40]	10 [3-23]	P<0.001	
Image quality (n="good")	125/132 (95%)	80/85 (94%)	P=NS	

Clinical Impact

Rapid approach saved

- 13 minutes scanning
- 10 minutes reporting time.

Following the trial, rapid CMR became routine for 1 in 4 patients.

Booking slots reduced to 50 minutes (from 1 hour)

Daily activity increase of +3 patients a day.

Next Challenge

This work was done at a large, established CMR centre

The next challenge will be to implement at smaller centres

References

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