ARTIFICIAL INTELLIGENCE FACILITATES MONITORING OF PATIENTS WITH HEART FAILURE IN THE LOVE-HF TRIAL

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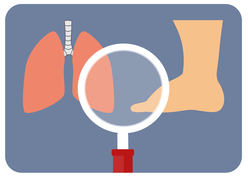
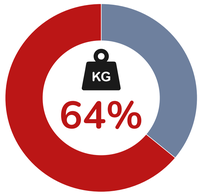
INTRODUCTION:

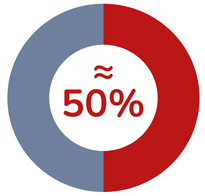
Early detection of worsening congestion in heart failure (HF) patients can prompt timely interventions and potentially decrease hospital admissions.



Standard care recommendations **include the monitoring of symptoms** and daily weighing at home



of **patients do not weigh** themselves or **monitor symptoms** in the 2 weeks prior to admission [1]

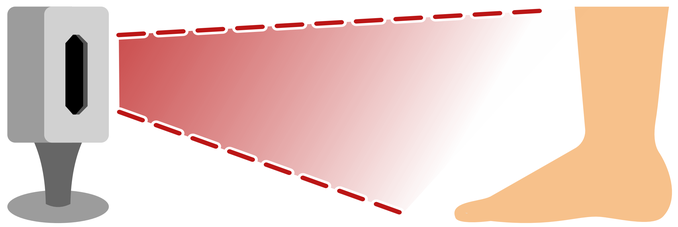


of admission are associated with **peripheral oedema** [2]

oedema is **strongly associated** with subsequent prognosis [2]

Is there a missed opportunity for clinicians to respond rapidly to early changes in congestion?

PURPOSE:



A camera-based technology linked to artificial intelligence software for remote home-monitoring of lower-leg volume was developed, that, unlike daily weights, does not require patient adherence.
The main aims of our pilot randomised cross-over trial were to determine the feasibility of data-collection and blinding of randomisation and to estimate event rates to inform the design of future trials of the AI device.

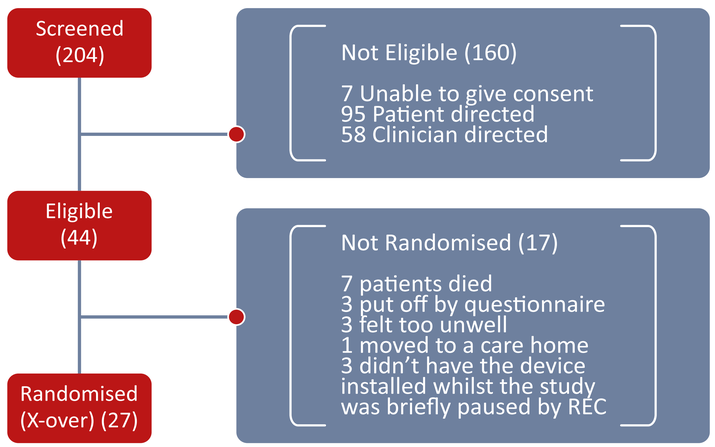
METHODS:

Single-centre, pilot, double-blind, randomised cross-over trial in patients with HF at increased risk of decompensated HF requiring hospital admission.

The main outcome measure was the proportion of participants that provided information on each available study day (ie: on the days they were alive and out of hospital over 30 days) of leg volume data, weight.

Patients received guideline-recommended care and were asked to report worsening symptoms or weight gain.

Patients were randomly assigned to having device monitoring data concealed or disclosed to a physician (as alerts) for two periods of 30 days.



RESULTS:

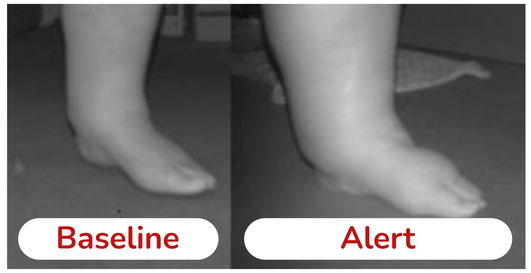
PARTICIPANTS:
27 heart failure patients, median age of 75 years old [63-78], 41% women, 48% with LVEF >50%.

37%

WEIGHT
37% of patients weighed themselves during the study on at least half of the days. Median number of days available with weight was 8.5 [0-21.5] days per month.

74%

LOWER LEG VOLUME
74% of patients had volume measured on at least half of the days. Median number of days available with volume was 25 [16-29] days per month.

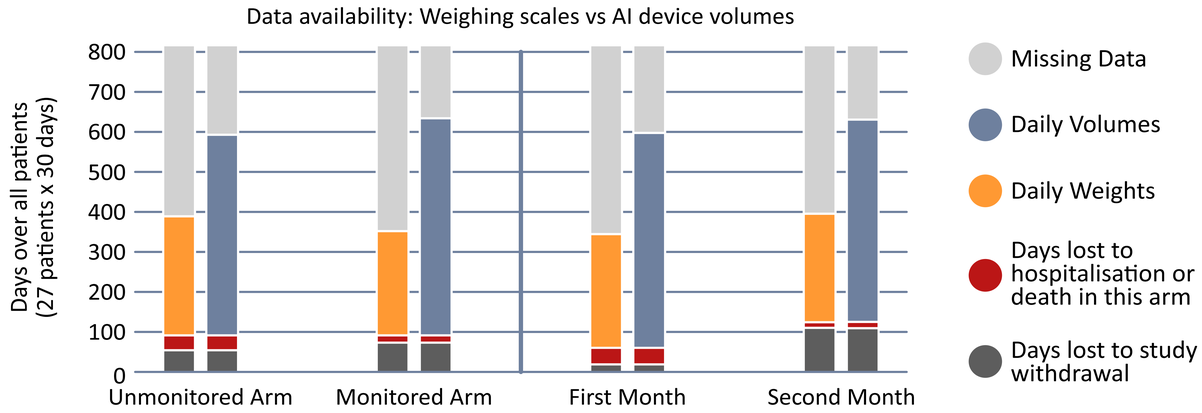


Sensitivity / Specificity:
Due to the limited opportunities to validate alerts face to face during our study (due to Covid pandemic restrictions), we provide a range for sensitivity and specificy to account for some uncertainty taken from patient reported symptoms and weight over the phone and contradicting information on GP records for example.

Sensitivity 85% - 89%

Specificity 53% - 82%

Example of lower leg swelling detected: The swelling for this patient developed over a few days, yet they didn't notice it.



CONCLUSIONS:

This pilot trial suggests that measurements of leg-volume are more likely to be acquired than weights for patients with HF. Given that weight and symptom monitoring is routinely recommended in HF management, this finding represents a potentially significant improvement over standard care.

1 Ziaeian B et al. 2016 2 Shoaib A et al. 2019

This work was supported by a research grant with funding provided by Heartfelt Technologies: the company which manufactures the AI device. The trial was registered as NCT04787380