

Real-life experiences from the first year of a virtual nodule clinic

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Introduction

Lung nodules are commonly identified in lung-cancer CT screening programmes, and often require follow up, as per the BTS guidelines(1).

In high risk populations the prevalence of pulmonary nodules detected on CT screening is approximately 33% (range 17-53%) (1). A rising number of CT screening programmes are being introduced, resulting in rising numbers of pulmonary nodules being identified and referred for follow up.

The Liverpool Healthy Lung Programme (UK) is one such screening programme targeting individuals with >5% risk of developing lung cancer over 5yrs.

The virtual nodule clinic was set up as a cost and resource efficient means to address the anticipated rise in demand on local respiratory services.

Methods

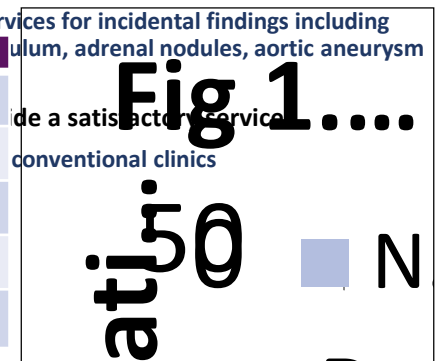
Description of the first year of the VNC (Sept 2016-17) at the Royal Liverpool University Hospital, UK

VNC included dedicated radiology and respiratory referrals to a time to evaluate imaging prior to the screening programme

Results

- **55 patients were referred to the VNC**
 - One third were referred with incidental nodule(s) detected on non-standard CT chests
 - 51 % were referred from the screening programme [n=28]
 - 22 % from other outpatient specialties [n=12]
 - 15 % directly from GPs [n=8] and the rest via inpatient admissions
- **Twenty-two patients had prior imaging available for comparison**
 - The nodule site was imaged in 15 of these; of which nine the nodule was present
 - Comparison facilitated immediate discharge for seven patients and significantly attenuated follow up for the remaining two (Fig 1)
- **A quarter of patients discussed at Radiology MDT did not require further imaging**
- **Virtual management saved 69 outpatient clinic visits and seven CT scans**
 - Seventeen of the 28 patients already discharged were managed completely virtually
 - 11 patients required referral to other services for incidental findings including

Nodules appearance and size			
Solid	67.2% [n=37]	≤6 mm	18.2% [n=10]
Sub-solid	20.0% [n=11]	6 - 8 mm	36.4% [n=20]
Ground-glass	3.6% [n=2]	> 8 mm	41.8% [n=23]
Spiculated	5.5% [n=3]	Micronodules	1.8% [n=1]
Unspecified	3.6% [n=2]	Unknown / Unspecified	1.8% [n=1]



Discussion

Our experience demonstrates that VNCs can prevent unnecessary follow up through the evaluation of images in a specialist Radiology MDT setting. VNCs also prevent unnecessary exposure to ionising radiation by using historical imaging for retrospective follow up of identified nodules. Our findings call for CT screening programmes to coordinate with local services to assess when CT screening would be maximally informative according to BTS guidelines based on available imaging. Our findings suggest a proportion of incidental nodules are not being followed up as per BTS guidelines; thus were retrospectively identified and reviewed as a result of the VNC. We demonstrate that once a service is established a variety of referrers will use it. Furthermore; incidental findings will be identified and robust referral pathways need to be in place to address these. Further work is needed around patient acceptance and understanding of the virtual service as well as costing analyses.

Recommendations for the effective introduction of virtual clinics and CT screening programmes

- Image sharing arrangements with local radiology departments prevent unnecessary radiation exposure
- Coordination of CT screening programmes with local services could reduce unnecessary CT scans by coordinating screening with pre-arranged follow up of known nodules
- Radiology MDTs within a VNC service can prevent the unnecessary follow up of stable nodules.
- Departments should expect a rise in demand for clinic appointments as a result of CT screening programmes
- Virtual clinics provide a time, cost and resource efficient means of meeting the resulting rise in demand
- Once a VNC has been established, providers should anticipate a parallel rise in referrals from other sources

