

Improving the sample sufficiency of Ultrasound Guided Fine Needle Aspirations of Thyroid nodules

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Aim

Improving the sample sufficiency of Ultrasound Guided Fine Needle Aspirations of thyroid nodules through the introduction of a sonographer-led neck ultrasound service and multidisciplinary working with cytopathology colleagues.

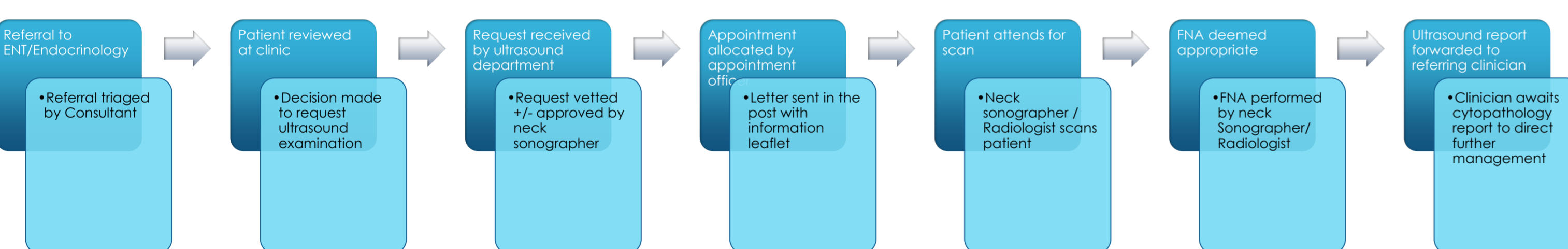
Background

Thyroid nodules are very common and their incidence increases with age. If a thyroid nodule is detected on ultrasound examination, the nodule is classified using the “U” classification system recommended by the British Thyroid Association depending on the characteristics they display on ultrasound from U1 – normal, to U5 -malignant (BTA guidelines 2014). Any nodule which is classified as U3 - 5 undergoes ultrasound guided fine needle aspiration cytology to clarify the diagnosis. FNAC is widely accepted as a safe, accurate, sensitive and cost-effective diagnostic procedure in the evaluation of thyroid nodules, with relatively low risk of complications. The results can reassure clinicians and patients alike that a nodule is benign, triage patients for diagnostic surgery, or provide a definite diagnosis of some thyroid malignancies enabling one-stage surgery. Unfortunately there are incidences where the sample obtained is insufficient for diagnosis and the procedure has to be repeated. This leads to additional discomfort for the patient, time delays in obtaining a diagnosis and pressure on already overstretched resources.

A sonographer led neck ultrasound service was set-up in our hospital with the following aims:

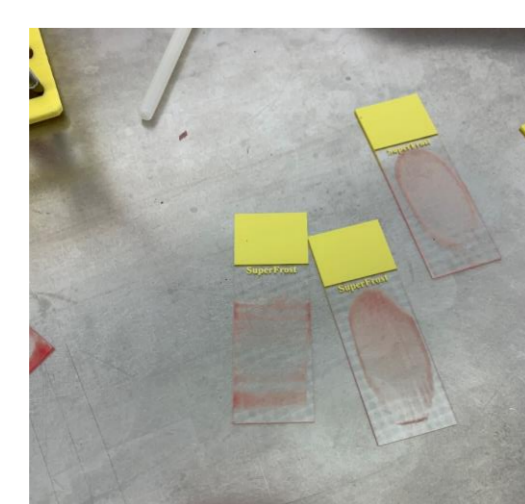
- Tackle service demands from the increasing referral rates & reduction in available Radiologists
- Maintaining waiting time targets (particularly red flag 2 week waits)
- Reduce the insufficiency rate of sampling via multidisciplinary working with our cytopathology colleagues.

Planned pathway



Method

- Two sonographers completed the Teesside University Case accredited Head and Neck Ultrasound with FNAC course
- They were trained to scan, report and sample independently after a period of mentorship by Consultant Radiologist colleagues. Performing core biopsies of neck lesions was also incorporated in training because for many patients this is more appropriate
- Sonographers liaised with biomedical scientist to learn how to correctly prepare slides for FNA samples, (on-site cytopathologist is not available in our hospital, also being able to do this ourselves means we can facilitate sampling appointments more readily)
- Following discussion with cytopathology colleagues we agreed to try a new fixative solution, (Cytolyt®) for needle washings
- Results from all FNAs and core biopsies undertaken were audited (successful sample recorded when adequate and diagnostic sample achieved)



- Images:
- Turkey breast phantom – using water balloons and pimento stuffed olives
 - Scanning phantom practicing FNA technique
 - Image of FNA of pimento stuffed olive within turkey breast
 - Learning slide preparation technique in cytopathology lab
 - Examples of acceptable and unacceptable slide preparation
 - Cytolyt® solution that was introduced to improve sample sufficiency.

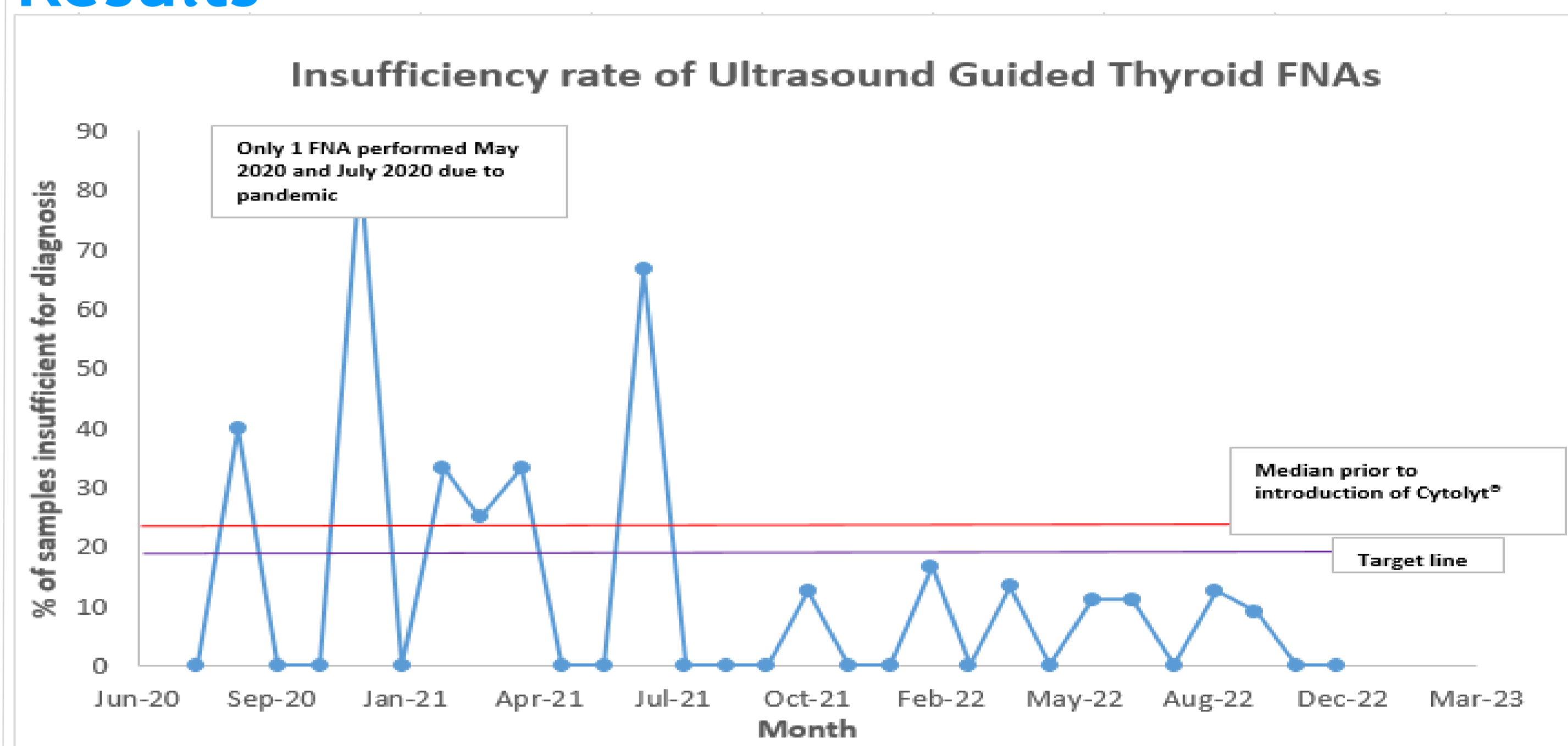
Benefits of Cytolyt®

- it is a fixative and so the cells are fixed immediately making them resemble cells in their natural state more closely without any artefacts that could make interpretation / diagnosis more difficult.
- there is more solution in the container and so it facilitates washings, making it easier for the user and resulting in more of the aspirate being included.
- If using sodium citrate, there is less solution in the container making it more difficult to use and also, it is not a fixative, just an anti-coagulant which prevents the sample clotting but this means cells can become distorted making interpretation / diagnosis more difficult.

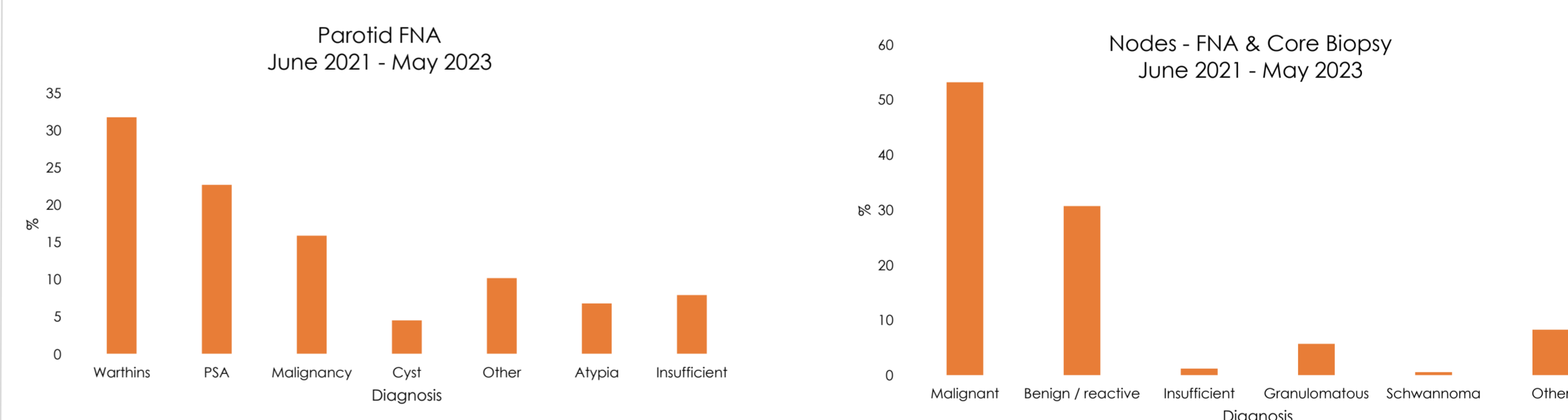
Challenges

Operationally the project was easy to implement but required a significant amount of training and time which was more difficult than we had envisaged due to staff shortages with long term sick, maternities and the impact of Covid.

Results



The sonographer- led neck service and the use of Cytolyt® with correctly prepared slides was introduced in July 2021 and from the above graph you can see that this led to a marked and sustained decrease in sample insufficiency for Thyroid FNAs during the 18 month period included. We have included results from sample adequacy audits for Parotid and Node sampling below which also demonstrated acceptable insufficient levels so we can be confident in our procedure no matter the area sampled.



Key Learning Points

- Introduction of the Cytolyt® solution and improved slide preparation has significantly decreased the insufficiency rate of thyroid FNAs.
- Training in both FNA and core biopsy allows for seamless patient care and the establishment of a truly sonographer led service
- Continual audit of sample adequacy ensures confidence in service offered by sonographers is maintained

Next Steps

- We are the first sonographers undertaking neck FNA and core biopsy in Northern Ireland so we hope to support our colleagues across the other Trusts within the region as this role extension is embraced.
- Continue collaborative working with Radiologist and Pathologist colleagues to improve and develop service.
- Look at ways to reduce sample inadequacy rate further and use of audit to highlight other areas for improvement

Acknowledgements

We would like to give special thanks Isobel O'Donnell, Biomedical Scientist for her training in slide preparation and on-going support and also to Dr Gillian Thompson, Dr Paul Farry and Dr Katarzyna Zygan, Consultant Radiologists for their mentorship and support in setting up the Sonographer-led neck service.

Key Reference Materials

Perros P et al, [Guidelines for the management of thyroid cancer](#), Third edition, British Thyroid Association, July 2014
 National Institute for Health and Care Excellence [Thyroid disease: assessment and management - Ultrasound guidance for fine needle aspiration](#), NICE guideline NG145, 2019
 A Ganguly, G Burnside, and P Nixon: [A systematic review of ultrasound-guided FNA of lesions in the head and neck—focusing on operator, sample inadequacy and presence of on-spot cytology service](#). British Journal of Radiology. December 2014; 87(1044)