Scrofula – The King's Evil
Sonographic features of tuberculous cervical lymphadenitis

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INTRODUCTION

Tuberculosis (TB) is an infection caused by the bacterium *Mycobacterium tuberculosis.* It commonly affects the lungs, and can be fatal if untreated. TB is one of the top 10 causes of death worldwide. In 2015, approximately 10.4 million people contracted the disease. A total of 1.8 million deaths were recorded, of which 400,000 were associated with human immunodeficiency virus (HIV) (WHO, 2016). At least 2 billion people are estimated to be latently infected with *M. tuberculosis,* of whom 10% are expected to develop the active disease (Behr and Waters, 2014).

TB has long plagued the developing world. Factors linked with its resurgence in non-endemic countries include increased migration, multi-drug resistance and acquired immunodeficiency syndrome (AIDS) (MacLean et al., 2013).

Extrapulmonary TB constitutes about 20% of all TB cases (Mohapatra and Janmeja, 2009). Fifteen percent of these are associated with the head and neck (MacLean et al., 2013). Cervical lymph nodes are frequently involved, leading to a visible manifestation historically referred to as *scrofula* (mycobacterial cervical lymphadenitis). In medieval times, it was long believed that a royal touch from a monarch had the power to cure scrofula, the *'king's evil'* (Figure 1) (Dossey, 2013).

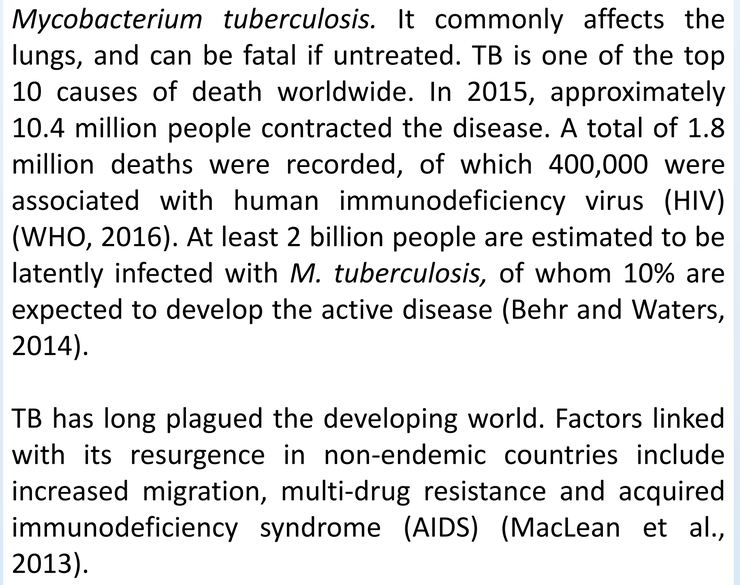

Figure 1: Charles II applying the royal touch to cure scrofula (Brogan, 2015)

Here, we describe the application of ultrasound (US) in a case of tuberculosis cervical lymphadenitis (TCL.) In contrast to other modalities, US has the advantage of being inexpensive and time efficient, while allowing the operator to guide therapeutic procedures such as fine-needle aspiration (FNA) and core-needle biopsy (CNB) (Chou et al., 2014).

PATIENT BACKGROUND

A 23-year old Nepalese woman was admitted to the emergency department (ED) of an Irish hospital with a 5 week history of right-sided supraclavicular swelling, neck pain, a non-productive cough and a 2 week history of night sweats. Her sister previously had TB. Differential diagnoses included TB, lymphoma and Bartonella (cat-scratch disease).

Figure 2: An example of right supraclavicular swelling (Mohapatra and Janmeja, 2009). The patient in our study presented with a swelling which progressed to a similar appearance.

DIAGNOSTICS & TREATMENT

April	**Chest x-ray.** Normal.
	US supraclavicular fossa. Cervical lymphadenopathy.
	US-guided CNB. Biopsy sent to lab. Abscess visualised.
	Quantiferon. Positive.
	Polymerase chain reaction (PCR) TB. Positive.
	MRI Neck. Scrofula confirmed.
	HIV. Negative.
	US guided FNA. Abscess drained for sensitivity testing.
	CT thorax, abdomen & pelvis. Cervical and mediastinal lymphadenopathy.
	RIPE treatment – 2 months. (Rifampin, Isoniazid, Pyrazinamide and Ethambutol)
May	**Auramine TB sputum.** Negative
	Nucleic acid amplification test (NAAT). Heavy acid-fast bacilli detected. Sensitivity to prescribed treatment confirmed.
May-July	**Poor response to initial course of antibiotics.** Further treatment with Rifinah, Pyridoxine and Prednisolone.
August	**US neck.** Large abscess.
	Abscess spontaneously drained on two occasions.
	US neck/axilla. Near complete resolution.
December	**US-guided FNA.** Residual fluid/myositis of pectoralis major.

TB CERVICAL LYMPHADENITIS

Relatively uncommon in Western countries, TCL is notoriously known as a "dangerous masquerade" because it can resemble almost any form of cervical infection or neoplasm. The condition typically progresses through a number of stages (Chou et al., 2014):

Stage 1 – Nodes with non-specific reactive changes
Stage 2 – Nodes fixed to surrounding tissue (periadenitis)
Stage 3 – Cold abscess
Stage 4 – Collar-stud abscess
Stage 5 – Sinus tract formation

ULTRASOUND EXAMINATION

The young lady received several US scans to monitor the progress of her treatment over time. Her initial response to anti-microbial treatment was poor, necessitating regular interrogation of the affected cervical node region. A high frequency linear probe was used for each US examination. Focal points were set to the level of the nodes. Colour Doppler US was used to assess the vascularity within each node.

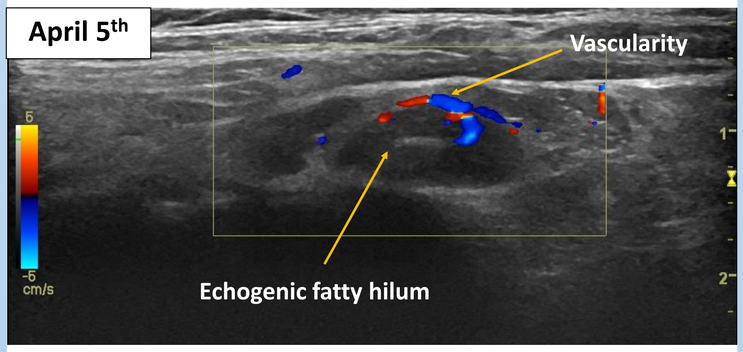

Figure 3: In the region of interest, as indicated by the patient, there was a non-pathologically enlarged lymph node measuring 6mm in its short axis diameter with a normal fatty hilum and vascular pattern.

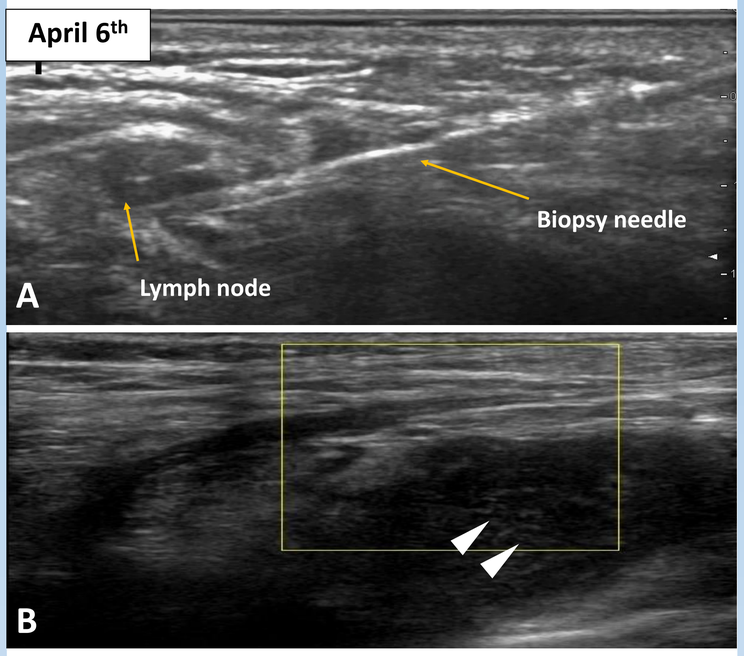

Figure 4: A – CNB of a cervical lymph node. B – Deep hypoechoic avascular mass with an inhomogeneous echotexture (arrowheads) representing a TB abscess. Ten millilitres of haemorrhagic purulent material was drained during a later FNA.

ULTRASOUND EXAMINATION

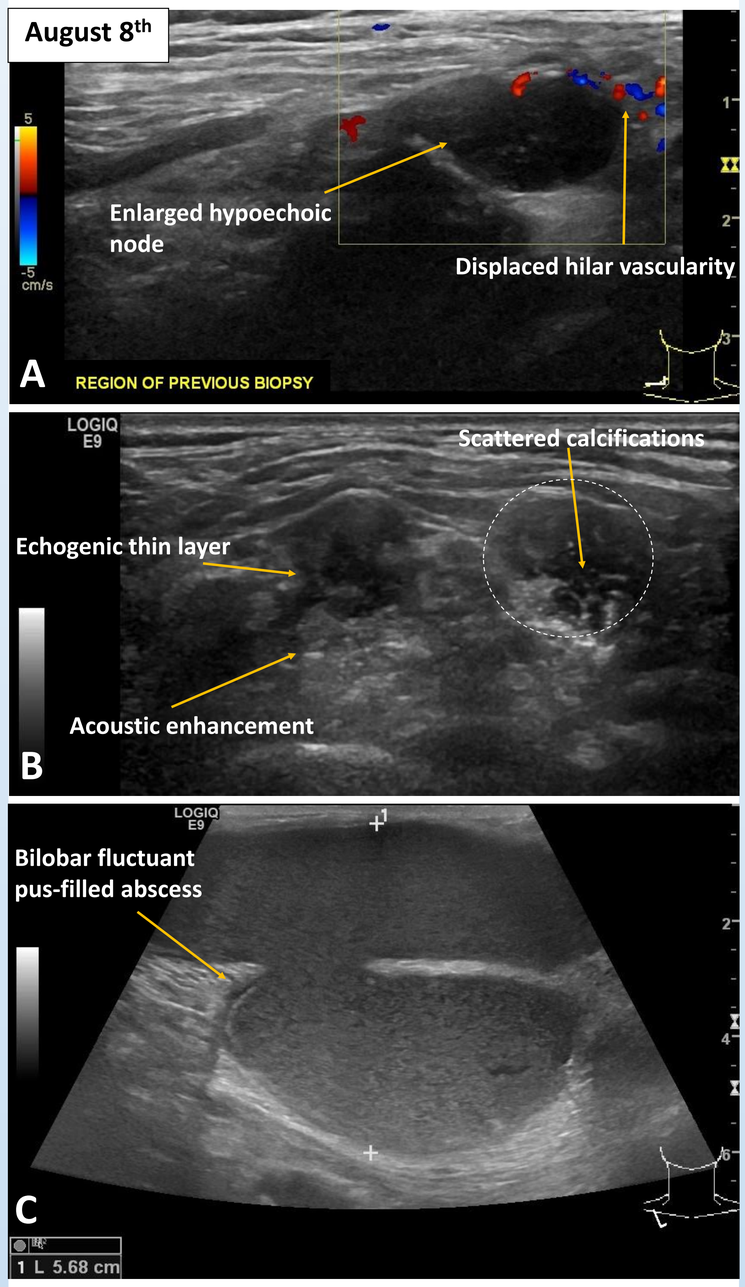

Figure 5: A – Intranodal cystic necrosis causing peripheral displacement of the hilar vascularity. B – Rounded nodes with early signs of matting. Evidence of thin echogenic layering at the peripheral margins, and scattered calcifications. Periadenitis is evident as the nodes invade surrounding tissues. C – Pus-filled collar stud abscess extending into the infraclavicular right anterior thorax. It has a short axis diameter of 5.68cm.

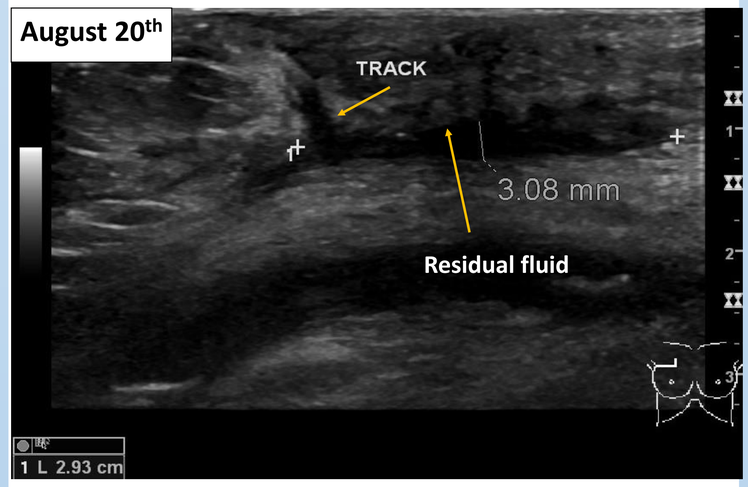

Figure 6: Near complete resolution post spontaneous discharging of the abscess on two occasions through a sinus tract which extended to the right axilla.

CONCLUSION

Key US features of TCL include hypoechogenicity, strong internal echoes, thin echogenic layers, nodal matting, displaced vascularity and abscess formation (Chou et al., 2014). In addition to its role in assisting the diagnosis of scrofula, US has a part to play in the ongoing monitoring of response to treatment in complex cases of TCL.

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