CASE REPORT

Case Report on a Rare Sequele of Long Covid: Long Covid Induced Occult Rib Fracture

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ABSTRACT

This paper aims on two objectives (i) to report a case of occult cough induced rib fracture following long Covid, and (ii) to introduced ultrasound as one of good modalities to detect occult rib fracture. A 38-year-old man, 3 weeks post Covid-19 presented with acute right-sided chest pain at the 5th intercostal ribs. Electrocardiogram and echocardiogram were normal. His chest Xray showed no sign of pneumonia or pneumothorax. A bedside ultrasound revealed an occult rib fracture, and he was treated conservatively with pain control, deep breathing exercise, and mucolytic and anti-tussive medication. Subsequent, 8 weeks follow-ups showed pain-free symptoms and no tenderness around the 5th ribs and repeated ultrasound showed healed rib fracture. Solitary rib fracture is often miss in Xray, and CT scan is not commonly available in primary care settings. Thus, ultrasound can be used as one of the modalities to detect rib fracture.
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INTRODUCTION

Post-Covid-19 infections can have long-lasting effects, including persistent coughs (1, 2). Serious cause of chest pain post-Covid-19 is due to pulmonary embolism, myocarditis and pneumonitis (1). However, chest pain secondary to spontaneous rib fracture due to severe cough post-Covid-19 is rarely reported. Rib fracture can potentiate a life-threatening event such as pneumothorax, hemothorax and flail chest. Thus, early detection of rib fracture is crucial

This paper aims on two objectives (i) to report a case of missed cough induced rib fracture following long Covid, (ii) introduced ultrasound as one of good modalities to detect rib fracture.

CASE REPORT

This is a case of 38 years old gentleman, non-smoker, no known medical illness, presented to family medicine clinic with complained of acute onset right sided chest pain, specifically at 5th intercostal ribs. He had history of Covid-19 infection, presented with fever for two days, cough and running nose, with positive Covid-19 antigen. He was categorized as Covid category 2a, and was prescribed with supportive medication for his cough, fever and flu, and was quarantine for five days. Subsequently, he developed prolonged severe cough with thick sputum, which was worse at night. He continued his anti-tussive medication for three weeks but did not seek any medical attention for his cough. Three weeks post Covid, he developed the right sided severe chest pain, worse on coughing, sneezing, and deep breathing. It is not a typical chest pain for angina, and non-radiating. There was no history of trauma. The was no reduced effort tolerance, symptoms of heart failure, palpitation, nor any symptoms deep vein thrombosis. Clinical examination at family medicine clinic revealed normotensive, normal saturation, and not in respiratory distress. He does not demonstrate any sign of heart failure. His respiratory examination revealed equal and good air entry. There were no pericardial and pleural rub heard. He underwent extensive work-up. His chest Xray posterior anterior view revealed no rib fracture, no sign of pneumothorax, lung fibrosis nor any pneumonia changes. His electrocardiogram revealed normal sinus rhythm with early repolarization, and his echocardiogram revealed normal ejection fraction of 68%, with normal regional wall motion and no sign of pericarditis. He was discharge from family medicine clinic with NSAIDs and

referred to sports medicine clinic for costochondritis. He was seen at sports medicine clinic at 6th week post Covid-19. He still has right sided chest pain, localized, non-radiating, worse on deep breathing, coughing and sneezing, and pain improved after taking NSAIDs. Clinical examination revealed tenderness at right 5th ribs. Bedside ultrasound unicortical break at the right 5th ribs with callus formation (Fig.1). Repeated oblique view chest Xray confirmed the diagnosis of rib fracture (Fig. 2). He was investigated for secondary cause of atraumatic fracture, revealed a normal investigation (Table I). He was treated conservative, with adequate pain control, deep breathing exercise and most importantly, mucolytic and anti-tussive medication. 8 weeks (11th week post Covid) follow up revealed, pain free symptoms, absence of tenderness around 5th ribs and repeated ultrasound showed healed rib fracture (Fig 1).

DISCUSSION

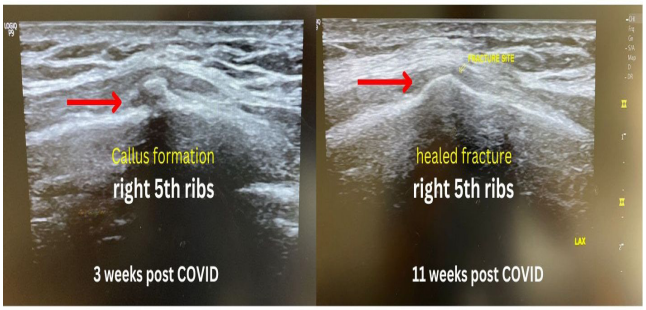

Fig. 1: The left image is captured at 3rd week post Covid, showing a callus formation (red arrow) at the 5th ribs in a long axis view, and sono-palpation elicit similar pain. The ultrasound was repeated at 11th week post COVID (image on the right) showing healed rib fracture (red arrow) and absence of tenderness on sono-palpation.

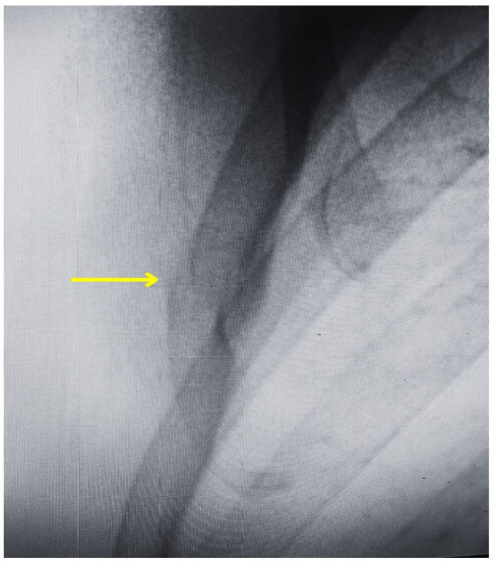

Fig. 2: Oblique view chest Xray showing the rib fracture (yellow arrow)

Table I: Baseline blood investigations

Full blood count			unit
	Haemoglobin	139	g/L
	Platelet	341	10^9/L
	White blood cell count	10.3	10^9/L
Renal function test			
	Urea	5.5	mmol/L
	Creatinine	84	umol/L
Bone Profile			
	Corrected calcium	2.41	mmol/L
	phosphate	1.06	mmol/L
	Parathyroid hormone intact	4.6	pmol/L
Thyroid function test			
	Free T4	16.3	pmol/L
	Thyroid stimulating hormone	0.76	mIU/L
Inflammatory markers			
	c-reactive protein	<0.05	mg/L
	Erythrocyte sedimentation rate	2	mm/hr

Long Covid often associated with persistent cough, and this can last up to weeks. Severe cough can induce rib fracture through repetitive mechanical strain on ribs as the cough force is greater than the elastic limits of the bone. Coughing is a protective response of the lower respiratory system. The coughing process involves the contraction of inspiratory and expiratory muscles, leading to significant changes in intrapleural pressure that might result in numerous problems. Coughing exerts a force in the opposite direction on the ribs, which may exceed their capacity to withstand. Risk factors for cough induced rib fracture includes smoking, bronchial asthma, chronic obstructive pulmonary disease, osteoporosis, and chronic corticosteroids use, which is absence in our patient (3). In our case, long Covid can be one of the possible risk factors. Sano et al. (2015) examined 14 cough induced rib fractures at their centre, found that most common presentation were solitary ribs, involving middle or lower ribs similar to our case (4).

To diagnose rib fracture, conventional choice was to use X-ray chest oblique view. However, this is often missed especially on solitary, unicortical fracture. Chest CT is a gold standard to confirm presence of rib fracture. However, this type of imaging is expensive and not available is most of small centers like primary care clinic. The role of ultrasound as emerge as one of the modalities for detecting rib fracture in this setting. One study compared sensitivity of bedside ultrasound and chest Xray, found that ultrasound has a better sensitivity

(93.8%) compared to chest Xray (37.2%) in ruling out rib fracture (5). Ultrasound also can help detect associated complication such as hemothorax and pneumothorax (5). The diagnostic criteria to detect the rib fracture in ultrasound were discontinuity of cortical alignment and acoustic linear edge shadow. In our study, formation for callus supports the finding of rib fracture.

CONCLUSION

We report a chronic cough induced rib fracture caused by long Covid syndrome. Solitary rib fracture is often miss in Xray and CT scan is not commonly available in primary care settings. Thus, ultrasound can be used as one of the modalities to detect rib fracture.

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