Case Report

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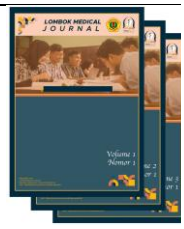

An Unusual Case of Idiopathic Digital Clubbing: Diagnostic Challenges in a Resource-Limited Rural Setting

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Abstract: Digital clubbing is a clinical sign characterized by bulbous enlargement of the distal phalanges and is commonly associated with underlying systemic diseases, particularly cardiopulmonary disorders and malignancy. Idiopathic digital clubbing is rare and represents a diagnosis of exclusion. Establishing this diagnosis is especially challenging in rural healthcare settings with limited access to advanced diagnostic modalities. This case report highlights the importance of a structured diagnostic approach and clinical reasoning in identifying idiopathic digital clubbing in a resource-limited rural setting. A 19-year-old male presented with progressive enlargement, thickening, and rounding of the fingers and toes over a three-year period, accompanied by mild to moderate pain and erythema. Physical examination revealed bilateral digital swelling with a positive Schamroth's sign. Chest radiography, electrocardiography, transthoracic echocardiography, and abdominal ultrasonography showed no abnormalities. Laboratory investigations were within normal limits except for an elevated free thyroxine (FT4) level with a normal thyroid-stimulating hormone (TSH). Thyroid ultrasonography demonstrated normal gland morphology, and there were no clinical features suggestive of Graves' disease or thyroid acropachy. Radiographs of the extremities revealed minimal periosteal reaction with surrounding soft tissue swelling. Based on systematic exclusion of secondary causes using available clinical and basic investigative tools, the patient was diagnosed with idiopathic digital clubbing. Further advanced investigations could not be performed due to limited diagnostic resources. This case illustrates that idiopathic digital clubbing can be diagnosed through careful exclusion of secondary causes using available clinical and basic diagnostic tools. A structured diagnostic approach and sound clinical reasoning are essential, particularly in rural settings with limited resources, and long-term follow-up is warranted to detect potential underlying systemic diseases.

Keywords: Digital Clubbing, Idiopathic Etiology, Diagnostic Approach

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Introduction

Digital clubbing is a clinical sign characterized by enlargement of the distal tip of the finger due to soft tissue proliferation and changes in nail angle (Callemeyn et al., 2016). This finding is often associated with multiple serious systemic diseases, especially

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pulmonary and cardiovascular disorders, so its presence has important clinical value as a clue to the underlying disease (Chan, 2015; Essouma et al., 2022). However, in a minority of cases, no secondary etiology can be identified, and the condition is termed idiopathic digital clubbing, a rare and incompletely understood entity (Essouma et al., 2022; Karunarathna et al., 2025). Diagnostic challenges become more complex in rural areas with limited advanced examination facilities. This case report aims to highlight a stepwise diagnostic approach and clinical reasoning in a case of digital clubbing in a resource-limited setting, as well as improve understanding of idiopathic clubbing.

Case Report

A 19-year-old male came to Patut Patuh Patju General Hospital presented with complaints of progressive enlargement, thickening and rounding of the fingers and toes over the past three years. The complaints were accompanied by mild to moderate pain, especially after waking up, which persisted throughout the day and was accompanied by redness of the fingertips. The patient also complained of easy fatigue, excessive sweating, and palpitations since the last three years, especially during moderate to strenuous physical activity. The patient denied any similar complaints in the family.

Physical examination showed good general condition with compos mentis consciousness. Vital signs were within normal limits. There were no abnormalities on general physical examination, including no ophthalmopathy or dermopathy. Local examination of the fingers and toes showed bilateral swelling, redness, tenderness (Figure 1A and 1B), and positive Schamroth's sign (Figure 2). Thoracic x-ray and electrocardiography examination were normal. Basic laboratory tests were within normal limits, but thyroid function tests showed an elevated free thyroxine (FT4) level of 24.36 pmol/L (reference range 10.6–19.4 pmol/L) with a normal thyroid-stimulating hormone (TSH) level of 1.63 µIU/mL (reference range 0.25–5.00 µIU/mL). X-rays of the extremities showed minimal solid periosteal reaction on the distal phalanges of the fingers and toes bilaterally with soft tissue swelling (Figure 3). Neck ultrasonography showed normal thyroid tissue, and abdominal ultrasonography showed no abnormalities. Transthoracic echocardiography was performed to exclude cardiac involvement and was normal. Further evaluation for thyroid disorders and other etiologies could not be performed completely due to Patut Patuh Patju General Hospital serving a rural district with limited access to subspecialist services and advanced diagnostic facilities.

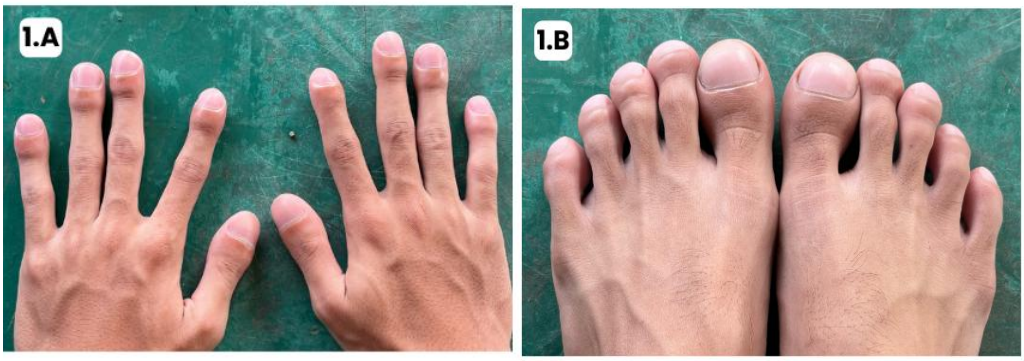

Figure 1. Bilateral swelling and redness of fingers (A) and toes (B).

Figure 2. Schamroth's sign showing disappearance of the normal diamond-shaped window between the nails of two opposing fingers indicating clubbing.

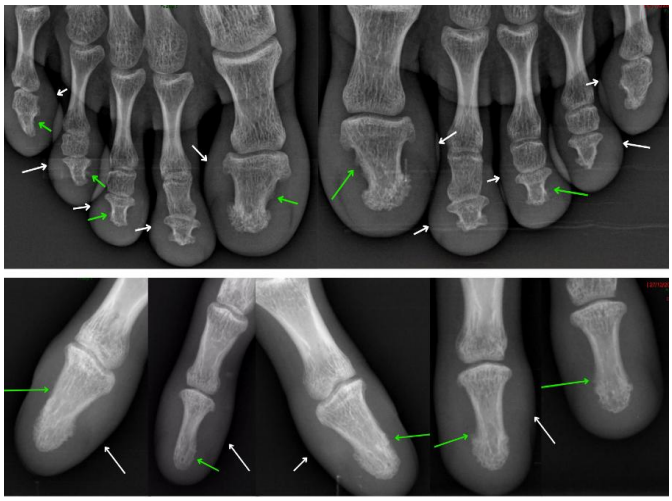

Figure 3. X-rays manus and pedis bilateral showed minimal solid periosteal reaction on the distal phalanges of the fingers and toes bilaterally with soft tissue swelling.

Discussion

The diagnostic workup in this case was guided by a stepwise, exclusion-based approach within the limitation of a secondary-level rural facility. Figure 4 shows the initial evaluation diagram for clubbing finger based on the diagnosis algorithm adopted from Callemeyn *et al.* and Chan CW (Callemeyn et al., 2016; Chan, 2015).

Initial evaluation focused on the most frequent and potentially serious causes. A normal thoracic radiologic examination decreased the likelihood of chronic lung disease or significant intrathoracic neoplasms. Normal electrocardiographic and echocardiographic results help rule out the possibility of structural heart disease or circulatory abnormalities often associated with clubbing. The finding of minimal periosteal reaction on limb x-rays raises consideration of hypertrophic osteoarthropathy (HOA). HOA has cardinal signs of periostosis (abnormal periosteal bone accumulation) on long bones, joint pain, and swelling of the fingers, and the cause may be due to several conditions include pulmonary disorders (bronchogenic cancer, mesothelioma, bronchiectasis, lung abscess), cardiovascular diseases (cyanotic congenital heart disease, infectious endocarditis, cardiac tumors, pulmonary arteriovenous fistula), or gastroenterological disorders (cirrhosis, inflammatory bowel disease), among others (Jamieson, 2011; Singh et al., 2025). In some cases, HOA can be classified into primary HOA and associated with a rare genetic disorder called pachydermoperiostosis, which is characterized by skin thickening and periostotis and if there are incomplete criteria from the primary HOA, it can be categorized as familial clubbing (Chan, 2015). However, the absence of pachydermia and absence of underlying pulmonary, cardiac disease or malignancy, as well as the stability of the patient's clinical condition, makes the possibility less likely. A normal abdominal ultrasound examination also helps to exclude hepatobiliary disease or intra-abdominal malignancy.

The diagnostic challenge presented by the patient's thyroid profile of elevated FT4 levels with TSH levels remaining within normal limits led to initial consideration of the possibility of thyroid acropachy, which is a rare manifestation of Graves' disease. However, this pattern is not consistent with the typical presentation of Graves' disease, where primary hyperthyroidism is almost always characterized by clear TSH suppression due to peripheral thyroid hormone negative feedback (Jadidi et al., 2019; Yılmaz & Ok, 2021). In addition, the patient did not show typical clinical manifestations of Graves' disease, such as ophthalmopathy or thyroid dermopathy, and was supported by ultrasound examination of the thyroid showing normal glandular structure (Corral-Forteza et al., 2021; Yılmaz & Ok, 2021). Limited facilities for advanced tests, such as TSH receptor antibodies (TRAb), do limit definitive confirmation of thyroid etiology (Udayappan & Anstine, 2025). It is important to note that the resource limitation in this case refers specifically to the unavailability of advanced confirmatory tests—such as TRAb assays, thyroid scintigraphy, and high-resolution imaging—which are typically only available at tertiary referral centers and were not accessible at this secondary-level facility. In this context, elevated FT4 with normal TSH is more likely to represent non-specific biochemical variations, transient conditions, or limitations in interpretation due to the unavailability of advanced investigations rather than a clinically significant manifestation of primary hyperthyroidism (Callemeyn et al., 2016; Yılmaz & Ok, 2021). Therefore, although thyroid disorders were considered as a differential diagnosis, the available evidence was not strong enough to establish it as a primary diagnosis.

With no evidence of systemic disease identified through available evaluations, and given the clinically stable, chronic course of the condition, idiopathic digital clubbing was the most defensible diagnosis in this case. This finding reflects the continued relevance of structured clinical reasoning when advanced diagnostic tools are out of reach. (Karunarathna et al., 2025).

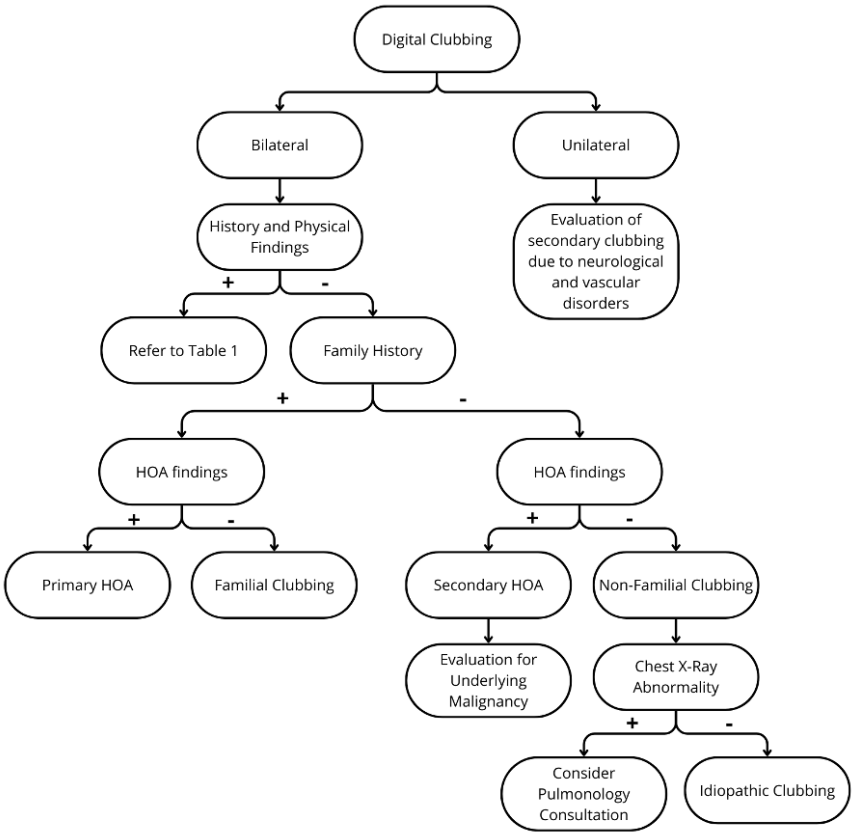

Figure 4. Clubbing finger diagnosis algorithm (Callemeyn et al., 2016; Chan, 2015).

Table 1. Recommended diagnostic tests and referrals based on any positive findings identified during the medical history and physical examination (Callemeyn et al., 2016; Chan, 2015).

Positive History and Physical Examinations	**Investigations**	**Consider further investigation if the initial examination results are inconclusive**
Cough Dyspneu History of smoking Exposure to tuberculosis Asbestos exposure	CXR, BGA, PPD Test	Chest CT-Scan
History of congenital cyanotic heart disease	CXR, ECG, BGA	Echocardiography, Chest HR-CT Scan
RUQ tenderness Jaundice Hepatitis risk factors	AST, ALT, Bilirubin, Urea, Electrolytes Serum, Hepatitis Serology	Abdominal Ultrasound
Abdominal pain Diarrhoea	CBC, Urea, Electrolytes Serum, Stool Culture	Colonoscopy
Fever Chills Night sweats Weight loss	CXR, CBC, Blood Culture	HIV Test, PPD Test
Exophthalmos Pretibial myxedema Goiter	TSH, Free T4	Anti-TSH Receptor Antibodies

Conclusion

This case report demonstrates that idiopathic digital clubbing can be diagnosed through a systematic, exclusion-based approach even in settings without access to advanced confirmatory diagnostics, such as TSH receptor antibody (TRAb) assays, thyroid scintigraphy, or high-resolution imaging, which were unavailable at this secondary-level facility. Through careful utilization of available secondary-level investigations and structured clinical reasoning, the most common secondary causes can be rationally excluded. This case emphasizes the importance of sound clinical reasoning in daily practice and the need for long-term follow-up in patients with idiopathic clubbing, as systemic disease may manifest later. The presentation of this case is expected to increase clinicians' understanding and awareness of digital clubbing diagnosis in settings with limited access to advanced diagnostic services.

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