JIDC | THE JOURNAL OF INFECTION IN DEVELOPING COUNTRIES

*Case Report*

# Nasopharyngeal melioidosis: a case report

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## Abstract

A 12-year-old boy was admitted after 11 days of fever and 2 days of nasal obstruction as well as swelling of a right cervical lymph node. Nasal endoscopy and computed tomography of the neck showed a nasopharyngeal mass occupying the entire nasopharynx, extending into the nasal cavity, and obliterating the fossa of Rosenmuller. Abdominal ultrasonography revealed a small solitary splenic abscess. Although a nasopharyngeal tumor or malignancy was initially considered, biopsy of the mass showed only suppurative granulomatous inflammation, and bacterial culture from the enlarged cervical lymph node yielded *Burkholderia pseudomallei*. The symptoms, nasopharyngeal mass, and cervical lymph node enlargement resolved with melioidosis-directed antibiotic therapy. Although rarely reported, the nasopharynx may be an important primary site of infection in melioidosis patients, especially in pediatric patients.

**Key words:** Melioidosis, *Burkholderia pseudomallei*, nasopharynx, head and neck.

*J Infect Dev Ctries* 2023; 17(6):886-890. doi:10.3855/jidc.17821

(Received 17 December 2022 – Accepted 16 February 2023)



## Introduction

Melioidosis, caused by the gram-negative bacillus *Burkholderia pseudomallei*, is an important cause of mortality in adults and children in Southeast Asia [1,2]. In addition to the difficulties in laboratory diagnosis, the high mortality rate of melioidosis may also be related to difficulties in the clinical recognition of the disease [3]. For example, in children with culture-confirmed melioidosis and a case fatality ratio of 24% in Sarawak, Malaysia, delays in diagnosis and initiation of melioidosis-appropriate antibiotic treatment were reported in nearly 90% of cases [2]. Difficulties in the clinical recognition of melioidosis occur due to the broad clinical spectrum of the disease and nonspecific presentation; in fact, melioidosis has been described as a great mimicker of diseases [4,5]. Additionally, the predilection of organ-site involvement differs between adult and pediatric age groups, and it also differs between geographical regions [6-8]. These variations in organ-site involvement and presenting manifestation are caused by differences in host risk factors, route of infection, bacterial load and strain, and the presence or absence of specific *B. pseudomallei* virulence genes [3]. Furthermore, rare disease manifestations are occasionally observed, further complicating the diagnostic process [9].

The nasopharynx and oropharynx are extremely common sites of disease, both in children and adults. These sites may be affected by various pathological processes, from some of the most common infections in humans, such as those caused by respiratory viruses or gram-positive bacteria, to tumors and malignancies. In this report, we describe a child who was found to have a nasopharyngeal mass following presentation with fever, nasal obstruction, and cervical lymph node enlargement and who was ultimately diagnosed with culture-confirmed melioidosis.

## Case presentation

A 12-year-old boy presented with an 11-day history of high-grade fever and 2 days of nasal obstruction and right-sided neck pain. He also developed new-onset snoring during this time. He initially sought treatment in a nearby government health clinic but received no antibiotics. He resided in a rural interior region and had a history of regularly swimming in a man-made pond used for rearing freshwater fish.

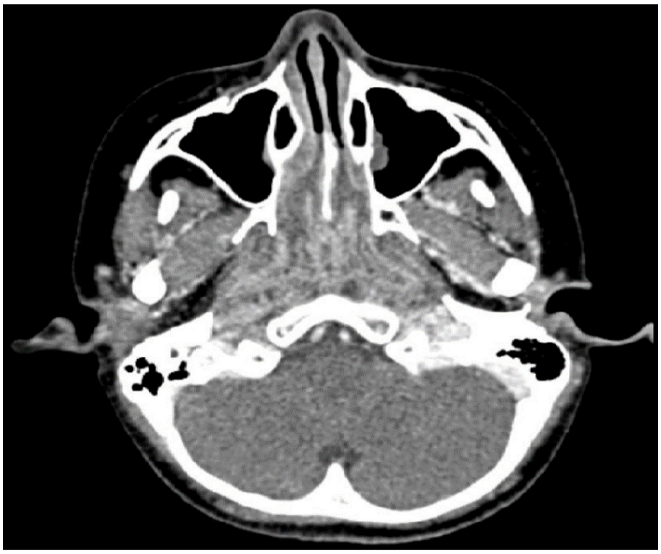
Physical examination revealed a boy with normal growth parameters but a high-grade fever. He had

normal blood pressure, was not tachypneic, and had no organomegaly. A firm, minimally tender 2 cm right jugular cervical lymph node was palpable. Examination of the head, neck, and oral cavity revealed no other abnormalities. In view of the nasal symptoms and cervical lymph node enlargement, an urgent otorhinolaryngology consultation was requested. Nasal endoscopy showed an irregular fleshy friable mass occupying the posterior nasal cavity bilaterally, with slough and contact bleeding (Figure 1A). A provisional diagnosis of lymphoma, nasopharyngeal carcinoma, or juvenile nasopharyngeal angiofibroma was suggested. The mass was biopsied, and a swab of the secretions was sent for bacterial culture. Additionally, fine-needle aspiration of the enlarged cervical lymph node was performed; specimens were sent for cytologic examination and bacterial culture via inoculation into a blood culture bottle.

Abdominal ultrasonography showed a well-defined solitary hypoechoic splenic lesion measuring 0.5 cm with central hyperechogenicity. Contrast-enhanced computed tomography of the neck demonstrated a heterogeneous soft tissue mass occupying the entire nasopharynx, extending into the posterior nasal spaces bilaterally and causing obliteration of the fossa of Rosenmuller (Figure 2). Additionally, several enlarged heterogeneous lymph nodes were observed in the retropharyngeal, submental, and cervical regions, with the largest measuring 2.4 cm.

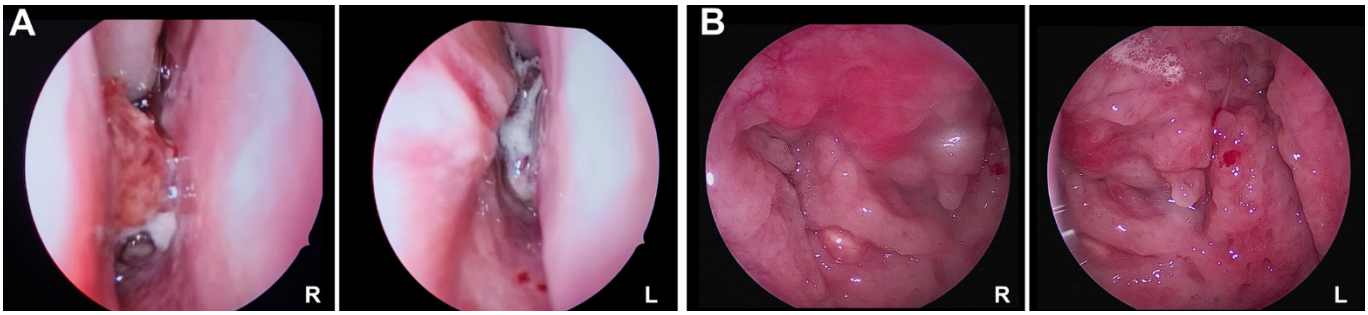
The hematological, biochemistry, and melioidosis serology investigation results are shown in Table 1 [10]. Bacterial cultures of blood samples were repeatedly negative, as were the cultures of secretions from the nasopharyngeal mass. However, *B. pseudomallei* was isolated from the aspirate of the cervical lymph node, and it was susceptible to ceftazidime, carbapenems, amoxicillin-clavulanate, and cotrimoxazole. The isolate was identified using API 20 NE (BioMérieux), and

**Figure 2.** Image from a teenage boy with nasopharyngeal melioidosis. Computed tomography of the neck showing a heterogeneous soft tissue mass occupying the entire nasopharynx and extending into the posterior nasal spaces bilaterally, causing obliteration of the fossa of Rosenmuller.



antibiotic susceptibility was determined using Etest (BioMérieux). Histopathologic examination of the nasopharyngeal mass biopsy specimen showed fragments of mucosal tissue with surface ulceration, neutrophilic micro-abscesses, fibrinous exudate, and necrotic debris that were associated with several epithelioid granulomata without multinucleated giant cells; these results suggested suppurative granulomatous inflammation. Immunoperoxidase staining demonstrated CD3+ T cells in admixture with CD20+ B cells, CD138+/MUM1+ plasma cells, and occasional CD56+ NK cells with few CD30+ activated lymphocytes. Cytologic examination of the lymph node aspirate revealed a heterogeneous population of lymphoid cells composed predominantly of mature

**Figure 1.** Images showing the nasal endoscopy findings of a teenage boy with culture-confirmed melioidosis. A. At admission, a fungating nasopharyngeal mass covered with ulcers and slough occupying the posterior half of the right (R) and left (L) nasal cavity was observed. B. On Day 33 of melioidosis antibiotic treatment, only a small residual lesion remained, with deep and clear fossae of Rosenmuller noted bilaterally.



lymphocytes, neutrophils and histiocytes, suggestive of reactive changes.

The patient was treated empirically on admission with intravenous ceftazidime in view of the presentation, risk factors for *B. pseudomallei* acquisition, and abdominal ultrasonography findings. This provisional diagnosis of melioidosis was confirmed with the isolation of *B. pseudomallei* from the cervical lymph node aspirate. Because his fever persisted, oral cotrimoxazole was added on Day 23 of admission.

Despite the persistence of fever, his general condition rapidly improved with melioidosis antibiotic therapy. The enlarged neck node gradually reduced in size, and the pain resolved. A repeat nasal endoscopy performed on Day 33 of antibiotics showed a significant reduction in the size of the nasopharyngeal mass (Figure 1B). Inflammatory markers also improved (Table 1). His fever finally resolved after 42 days, and he was given a total of 46 days of intensive-phase intravenous antibiotics. He was then discharged with oral cotrimoxazole eradication for an additional 3 months. He is currently asymptomatic and well.

## Discussion

This report describes in detail the clinical, laboratory, and imaging findings of a culture-confirmed case of melioidosis with nasopharyngeal involvement. A search of the PubMed/MEDLINE database using the key terms "melioidosis", "*Burkholderia pseudomallei*", "nasopharynx", and "nasopharyngeal" revealed only a single report of nasopharyngeal melioidosis in the published literature [11]. Although apparently rare, we believe nasopharyngeal involvement in melioidosis may be underreported and that the nasopharynx might be an important site of melioidosis infection, especially in children.

The head and neck region is a major site of melioidosis infection in children. In Thailand and Cambodia, 65% and 33% of children with melioidosis, respectively, present with head and neck manifestations, with the salivary glands predominantly involved [12,13]. In a previous report, we showed that nearly 60% of children with melioidosis in Sarawak, Malaysia, have head or neck manifestations [14]. Unlike children in Thailand and Cambodia, however, we found that cervical lymph nodes were the dominant organ site involved. Interestingly, none of these children had an infectious focus or lesion identified in the area of drainage of the involved nodes. Of note, none of the children underwent nasal endoscopy. In the present report, a nasopharyngeal mass was found on nasal endoscopy, which was likely the primary site of infection that led to cervical lymph node enlargement in the patient. The nasopharynx may in fact be an important occult site of infection in pediatric melioidosis. Children with an infection or mass in the nasopharynx may not have localizing symptoms early in the disease, and this site is not readily amenable to physical examination. Additionally, the lack of pediatric otorhinolaryngology or nasal endoscopy services in most resource-constrained regions where melioidosis is endemic may have prevented recognition of nasopharyngeal involvement. Further studies to determine the true prevalence of nasopharyngeal melioidosis are needed.

Although large gaps in knowledge remain, the acquisition of *B. pseudomallei* from the environment is believed to occur mainly via skin inoculation and inhalation and possibly ingestion [6]. These modes of acquisition explain the dominant presentations of adult melioidosis (pneumonia and bacteremia). In contrast, skin inoculation and inhalation do not readily explain the leading presentation of pediatric melioidosis, namely, head and neck melioidosis. This case report suggests that the nasopharynx (and the oropharynx) may be an important route of entry and primary site of infection in pediatric melioidosis patients. The

**Table 1.** Laboratory investigation results for a child with fever and nasopharyngeal mass due to melioidosis, Sarawak, Malaysia.

| Investigation | Admission | Day 15 | Day 35 |
|---|---|---|---|
| Hemoglobin, g/dL | 11.9 | 10.5 | 10.5 |
| Total white cell count, × $10^9$ cells/L | 21.9 | 12.3 | 8.2 |
| Neutrophil count, × $10^9$ cells/L | 16.6 | 8.0 | 4.0 |
| Lymphocyte count, × $10^9$ cells/L | 2.8 | 3.0 | 3.0 |
| Monocyte count, × $10^9$ cells/L | 2.4 | 1.1 | 0.9 |
| Platelet count, × $10^9$ cells/L | 431 | 488 | 438 |
| Erythrocyte sedimentary rate, mm/hr | 86 | - | - |
| C-reactive protein, mg/dL | 116 | 31 | 18 |
| Serum ferritin, ng/mL | 855 | - | - |
| *Burkholderia pseudomallei* ELISA IgM* | ≥ 1:1280 | ≥ 1:1280 | - |
| Peripheral blood film | No blasts | - | - |

* *Burkholderia pseudomallei* ELISA IgM was performed in the Institute for Medical Research, Malaysia, using whole cell antigen prepared from a *B. pseudomallei* B124E strain isolated from a clinical specimen and multilocus sequence typed as ST 289, as previously described [10].

nasopharynx and oropharynx contain a ring of lymphoid organs consisting of the pharyngeal tonsil, tubal tonsils, palatine tonsils, and lingual tonsils, and this is commonly referred to as Waldeyer's ring. This collection of lymphoid tissue represents the first line of defense against inhaled or ingested pathogens [15]. Following exposure to contaminated water sources while drinking, bathing or swimming [16], these lymphoid organs may be infected by *B. pseudomallei*. *B. pseudomallei* possesses various virulence factors enabling its attachment and persistence in both phagocytic and nonphagocytic cells [3]. Interestingly, infection of the oropharyngeal lymphoid tissue has been suggested by previous reports of sore throat and tonsillitis in children with melioidosis [17-19]. Additionally, the reported utility of throat swabs in the diagnosis of pediatric melioidosis may also suggest the importance of oropharyngeal (and nasopharyngeal) acquisition and infection [20]. Dissemination through the lymphatic system may follow oropharyngeal and nasopharyngeal infection, which may explain the frequent regional lymph node involvement seen in Sarawakian children. Although the exact mechanism underlying this secondary spread remains unclear, it has been shown that *B. pseudomallei* remains viable in antigen presenting cells such as dendritic cells and induces maturation and trafficking of these cells to secondary lymphoid organs [3,21]. Intriguingly, a previous animal study demonstrated *B. pseudomallei* nasal-associated lymphoid tissue infection and lymphatic dissemination [22].

## Conclusions

We report a culture-confirmed case of nasopharyngeal melioidosis. Although rarely reported, the nasopharynx may be an important primary site of infection in melioidosis patients, especially in pediatric patients. This occult site should be evaluated in adults and children with suspected melioidosis who present with fever without a source or cervical lymph node swelling. Melioidosis should be included in the differential diagnosis of a nasopharyngeal mass in patients residing in endemic regions.

## Acknowledgements

The authors would like to thank the Director General of Health Malaysia for permission to publish this paper. We thank Dr. Peter Sie-Teck Lau and Dr. Teresa Fuh-Guang Chua for their expertise in the diagnosis and management of the patient, Dr. Rohaidah Hashim for providing details of the serological methods performed at the Institute for Medical Research, Malaysia, and Dr. Kev Shiau-Chong Lim for his assistance in editing the images. We also thank all the other doctors and nurses involved in the care of the patient.

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**Conflict of interests:** No conflict of interests is declared.