

New-onset haemoptysis and associated lung mass in the setting of dental care avoidance during the COVID-19 pandemic

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SUMMARY

We present a case of new-onset haemoptysis and associated lung lesion on chest imaging in the setting of the COVID-19 pandemic. This was believed to be due to dental care avoidance after tooth fracture and long-term use of temporary dental filler, with subsequent aspiration and bronchial injury. Our patient underwent bronchoscopy due to persistent haemoptysis with findings of mild traumatic injury. She responded to conservative management with no pharmacologic intervention. With time, there was resolution of symptoms and radiographic improvement of the lung lesion. We include a brief discussion on the influence of the COVID-19 pandemic on healthcare avoidance, complications of tooth fracture and the differential diagnosis of a new solitary lung lesion on chest imaging.

BACKGROUND

Healthcare avoidance in the setting of COVID-19 has been described throughout the USA. Emergency departments have seen an almost 40% decline in visits since the start of the COVID-19 pandemic, including a decrease in emergency visits for serious conditions such as myocardial infarction and stroke.^{1,2} Patients and caregivers attributed healthcare avoidance to fear of contracting COVID-19.³ Similarly, dental offices observed a decline in both routine and emergency visits throughout the COVID-19 pandemic.^{4,5}

Emergency dental visits include patients with uncontrolled bleeding, infection, severe dental pain, facial or dental trauma and tooth fracture among others. Tooth fractures are typically categorised into five different classes with management including observation and supportive care to temporary restoration or tooth extraction. Prompt identification of a cracked tooth is important for proper management, including infection prevention or further fracture extension.⁶ Less well-characterised complications of a cracked tooth may manifest from delayed dental care and associated home-remedies. In this case, we describe a patient who experienced a tooth fracture, subsequent dental care avoidance due to the COVID-19 pandemic and prolonged use of temporary dental fillers who then developed haemoptysis and a new solitary lung lesion on chest imaging.

CASE PRESENTATION

A 60-year-old woman presented to our care after abnormal finding on chest X-ray following

evaluation in ear, nose and throat (ENT) clinic for chest discomfort and throat burning. She has a medical history of glaucoma and a remote history of smoking, greater than 30 years prior, with no known lung disease. Two months prior to presentation, patient felt a tooth 'explode' while eating popcorn and was unable to retrieve missing fragments. Due to the COVID-19 pandemic, the patient did not feel comfortable seeking dental care. Instead, the patient used temporary dental filling, which she bought at a local supercentre, and re-applied the filling weekly as it disintegrated. Four days before presentation to ENT, the patient developed an episode of left chest discomfort and throat burning. She subsequently coughed up three coin-sized pieces of blood. After this initial episode, she did not experience recurrent haemoptysis. At her ENT appointment, the evaluation was unremarkable with a normal laryngoscopy. Chest X-ray was performed and compared with imaging 6 years prior. New imaging showed a 4.0×3.9×2.1 cm lesion in the right lower lobe (RLL) ([figure 1A and B](#)). Patient denied fevers, chills, unintentional weight loss, shortness of breath, wheezing or chest pain. Physical examination was normal on presentation.

INVESTIGATIONS

Laboratory evaluation was insignificant with a white blood cell count of $8.8 \times 10^9/L$ with 82.6% neutrophils and 0.1% eosinophils ($0.01 \times 10^9/L$), a haemoglobin of 137 g/L, platelets 267 K/ μ L and an international normalised ratio of 1.1. Chest CT without contrast confirmed the presence of a 4×1.8×2.1 cm mass in the lateral segment of the RLL without associated abscess concerning for malignancy ([figure 2A](#)).

DIFFERENTIAL DIAGNOSIS

The differential diagnosis for a new lung lesion found on chest X-ray is broad and dependent on size, physical characteristics, timing and growth. An incidental solitary lesion ≤ 3 cm in diameter is classified as a nodule and encompasses a list of possible pathologies including cancer, benign neoplasm and bacterial or granulomatous infection among others. Solid lesions ≥ 8 mm increase the risk of malignancy and should undergo malignancy likelihood stratification.⁷ The most appropriate workup for a patient with a new lung lesion is a chest CT without contrast, as was performed in our patient.



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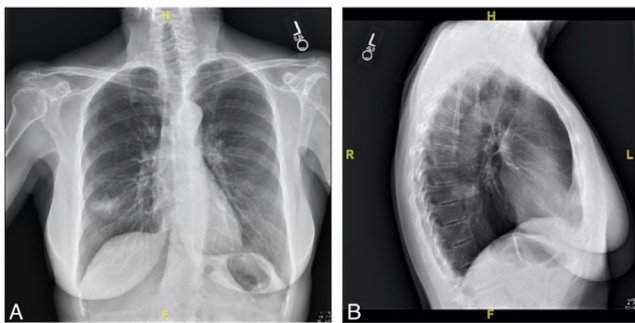


Figure 1 (A) and (B) Chest X-ray posteroanterior and lateral with 4.0×3.9×2.1 cm spiculated lung mass in the right lower lobe.

The patient denied unintentional weight loss and persistent cough, reported minimal history of smoking and had a radio-opaque object within the lung nodule on chest CT, all reducing the likelihood of malignancy. She also denied fevers, chills or recent travel, and with unremarkable labs, this made fungal or bacterial infection less likely. Recent environmental exposures included gardening and chlorine exposure after cleaning her pool 1 week prior to symptom onset, however, patient did not associate these events with onset of respiratory symptoms, and eosinophil count was normal. Therefore, we postulated that the lesion on her chest X-ray and subsequent CT scan were the result of tooth, popcorn or dental filling aspiration and subsequent airway inflammation, leading to haemoptysis and the findings displayed on chest imaging.

TREATMENT

The patient was provided with further diagnostic options including positron emission tomography/CT scan, CT-guided biopsy and bronchoscopy. Due to resolution of haemoptysis and her wish to minimise healthcare interactions, she opted for short-term follow-up with repeat CT scan. She was advised to discontinue the temporary dental filling application and to seek dental care. Five days later, however, she developed another episode of haemoptysis with no associated symptoms. She agreed to a bronchoscopy which revealed no evidence of foreign body, but small injury to the mucosa in the subsegments of the lateral segment of the RLL (*figure 2C*). Endobronchial ultrasound mapping of the mediastinum was negative. Cultures, including acid-fast bacilli, were negative. Patient was advised to continue supportive cares and monitor for symptoms; no medications or further interventions were provided.

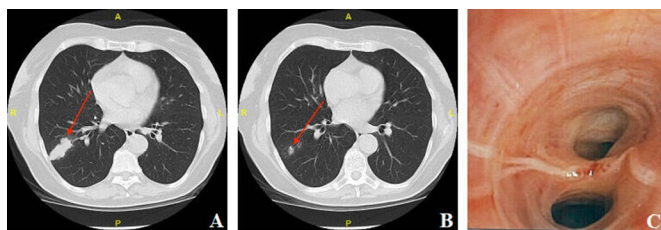


Figure 2 (A) Axial chest CT without contrast with arrow pointing to 4×1.8×2.1 cm mass in the lateral segment of the right lower lobe. (B) Axial chest CT without contrast, arrow pointing to a focus of calcification within the right lower lobe lung mass. (C) Bronchoscopy with evidence of small injury to a subcarina within the distal subsegments of the lateral segment of the right lower lobe.



Figure 3 Follow-up chest X-ray 1 month following symptom onset with considerable decrease in size of right lower lobe density.

OUTCOME AND FOLLOW-UP

Over the following weeks, the patient had two more episodes of productive cough; one 4 days following bronchoscopy with yellow phlegm and streaked red blood, and one after 19 days with thick, green material. Chest X-ray 1 month after symptom onset displayed interval improvement of RLL lesion (*figure 3*). Her symptoms have since resolved.

DISCUSSION

We believe our patient experienced temporary dental filler aspiration with haemoptysis due to healthcare avoidance in the setting of the COVID-19 pandemic. During the COVID-19 pandemic, medical providers observed a decline in both clinic and emergency room visits.^{3 8} Dental offices have similarly reported a decrease in emergency complaints.^{4 5} At the beginning of the pandemic, the American Dental Association recommended cessation of routine dental care in order to determine proper utilisation of personal protective equipment. However, emergency dental care was encouraged.⁹

In this case, our patient delayed seeking dental care due to the COVID-19 pandemic. The temporary dental filler our patient used from Walmart had a base made out of zinc oxide, calcium sulfate and petroleum jelly. This filler also had instructions to use for less than 48 hours to ensure follow-up with a dental provider. After frequent re-application and disintegration, we hypothesise that our patient experienced silent nighttime aspiration of this substance, which resulted in bronchial injury and haemoptysis. Our patient endorsed weekly dental filler application over a period of 2 months. The silent aspiration of this substance likely led to bronchial mucosa injury, blood and secretion accumulation and the appearance of a lung mass on chest imaging. Lipoid pneumonia from petroleum jelly aspiration may also contribute

to the solid consistency and identified size. Aspiration as the cause of our patient's presentation is further supported by the location of the mass (lateral RLL) and the presence of a small focus of calcification on chest CT scan. Both zinc and calcium are more radiopaque than enamel.^{10 11}

There are few studies on temporary dental filler, its utility and its risk for aspiration and subsequent bronchial injury. Various case reports have described a risk of aspiration during dental procedures, such as those involving dental cementation or single-tooth casting.¹² However, no studies have identified the risks of aspiration with long-term use of temporary dental filler.

Additionally, while our patient displayed a new solitary lung lesion >3 cm, the associated symptoms and history of present illness reduced the likelihood of malignancy, allowing us to conform to her wishes and pursue initial conservative management. While a new lung mass associated with haemoptysis necessitates ruling out malignancy, in certain monitored situations, when infectious or inflammatory etiologies are suspected, it is acceptable to delay additional testing and invasive procedures and opt for a short-term repeat of imaging studies.¹³ With time,

her haemoptysis, left-sided chest pain and throat discomfort resolved. The throat symptoms may have been due to irritation from the expectorated material, while her left-sided discomfort was likely due to musculoskeletal strain from cough, and the progression of her phlegm from bloody to yellow with streaks of blood to thick green speaks to the expected healing process.

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Case reports provide a valuable learning resource for the scientific community and can indicate areas of interest for future research. They should not be used in isolation to guide treatment choices or public health policy.

Patient's perspective

I live with my husband who has chronic medical conditions and relies on me for his care. With COVID-19, we took all the necessary precautions to keep him safe. When I broke my tooth, and despite assurances from friends and my dentist, I decided to hold off treatment to keep my husband safe. The temporary filling appeared to do its job.

When I started coughing blood, I was very scared. I have a strong family history of cancer. I couldn't even look at the CXR and CT. To know that it all could be from the filling was a relief. It made sense to me and that is why I felt comfortable waiting for the follow-up CXR and not have more biopsies.

Learning points

- ▶ The COVID-19 pandemic has reduced non-COVID-19-related health and dental care due to fear of contracting COVID-19.
- ▶ In the setting of COVID-19, it is recommended patients continue to use emergency dental care for concerns including but not limited to severe bleeding, pain or infection, to reduce the risk of complications related to home-based care.
- ▶ Risks of using temporary dental filler in the long-term setting include disintegration and consequent aspiration with haemoptysis.
- ▶ A reminder to use radiographic image characteristics in conjunction with the history of present illness and relevant medical history when interpreting new lung lesions on chest imaging.

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