

# The Use of Black Tea and Honey for the Treatment of Pharyngocutaneous Fistula

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## ABSTRACT

### Introduction:

Pharyngocutaneous fistula (PCF) is a common complication of oropharyngeal procedures that can lead to wound infection, flap failure, and inflammation or rupture of the carotid sheath. We describe a unique approach to treating PCF infections using honey and black tea in conjunction with antibiotics.

### Methods:

Case report

### Case Presentation:

A 72-year-old male with persistent p16+ squamous cell carcinoma (SCC) of the right base of tongue who received definitive chemoradiation 6 months prior presented to an otolaryngology clinic at a tertiary medical center with a fixed right level 2 neck mass and ulcerated base of tongue mass that was firm to palpation. The patient underwent salvage surgery to include near total glossectomy and bilateral neck dissection including right radical neck dissection. Submucosal SCC measuring 3.5 cm with extensive perineural invasion (PNI) was invading the root of the tongue (staged ypT4N1) requiring mandibulotomy with anterolateral thigh (ALT) free flap reconstruction. On the third day of post-operation recovery, thick tracheal secretions were noted and cultured, showing *Acinetobacter baumannii*. Ceftriaxone was added to the antibiotic regimen of clindamycin. Oral care was initiated on day 9 post-operation with a mixture of black tea and food-grade honey to begin rehabilitating the patient's swallowing abilities and to thin the oral secretions, along with switch to cefepime and vancomycin. Patient's drains had significantly improved within two weeks of initiating oral treatment.

### Discussion/Conclusions:

It is crucial to find alternative treatment remedies to address the issue of antibiotic resistance due to overuse. The antiseptic and healing properties of honey and black tea, as well as their therapeutic effects, make them promising natural remedies for multidrug-resistant infections.

## INTRODUCTION

- Pharyngocutaneous fistula (PCF) occurs in approximately a quarter of laryngectomies and/or glossectomies, causing significant morbidity that impacts the quality of life of patients.
- Honey has a long history of use as a wound healing agent and has been shown to have antiseptic and therapeutic effects largely due to the presence of hydrogen peroxide (and other bacteriostatic and bacteriocidal players) and hyperosmolarity [1,2].
- Black tea is another promising alternative treatment method that has displayed anti-microbial, anti-inflammatory, and antioxidant capabilities. Black tea components include polyphenolic compounds such as catechins and theaflavins, which have been shown to have various healing properties in prior studies [3, 4].
- In the following case, black tea and honey were effectively used to conservatively treat a pharyngocutaneous infection of *Acinetobacter baumannii* and *Enterococcus faecalis*.

### Post-operative PCF & Treatment

- The patient was staged ypT4N1; due to PCN allergy clindamycin was started.
- On the 3<sup>rd</sup> day post-op, thick tracheal secretions were noted and cultured, showing *Acinetobacter baumannii*. Ceftriaxone was added to the antibiotic regimen of clindamycin.
- Drains become discolored on day 6. Repeat culture of the oral cavity on the 9<sup>th</sup> day post-op showed *Enterococcus faecalis* and *Acinetobacter baumannii* nosocomialis.
- CT scan performed 9 days post-op showed a small fluid collection in the right neck being drained by the superficial fistula (Figure 2A-B).
- The patient was switched to cefepime and vancomycin, probiotic started.
- Oral care was initiated on day 9 post-op with a mixture of black tea and food-grade honey to begin rehabilitating the patient's swallowing abilities and to thin the oral secretions.
- Medihoney paste was added later to tropically treat the lip dehiscence.
- By postoperative day 24 (Figure 2C), the right drain was no longer cloudy, and the left drains had lightened and reduced significantly in outflow.
- CT scan taken 38 days post-operation showed interval resolution of the collection along the left lateral drain (Figure 2D).

## DISCUSSION

- The honey and black tea treatment method permitted the patient to circumvent the delayed oral feeding typically utilized during PCF management with a method that encourages the patient to swallow.
- The antibacterial properties of honey including hyperosmolarity, low pH, and the presence of hydrogen peroxide were able to decrease the severity of the infection within approximately seven days, illustrated by the absence of cloudy drainage from the right drain and significantly less drainage from the left side.
- This action against the *Enterococcus* infection could be potentially explained by defensin-1, which is effective against Gram-positive bacteria, and hydrogen peroxide, which is a potent reactive oxygen species (ROS) [5].

## CONCLUSION

- The overuse of antibiotics has contributed significantly to this problem; therefore, it is imperative to find alternative remedies to address the issue of antibiotic resistance.
- The antiseptic and healing properties of honey and black tea, as well as their therapeutic effects, make them promising natural remedies for multidrug-resistant infections..

## CASE PRESENTATION

### Initial Presentation & Imaging

- 72-year-old male with persistent p16+ squamous cell carcinoma (SCC) of the right base of tongue who received definitive chemoradiation 6 months prior
- Presented to an otolaryngology clinic at a tertiary medical center with a fixed right level 2 neck mass and ulcerated base of tongue mass that was firm to palpation.
- Imaging showed a mass deep within the root of the tongue situated to the right but crossing midline.
- The right Level II neck mass was consistent with extranodal extension (ENE) from a large lymph node.
- PET/CT showed persistent activity within the right base of tongue which increased standardized uptake value (SUV) from 8.1 to 12.9 on interval imaging after 2 months (Figure 1A-B).

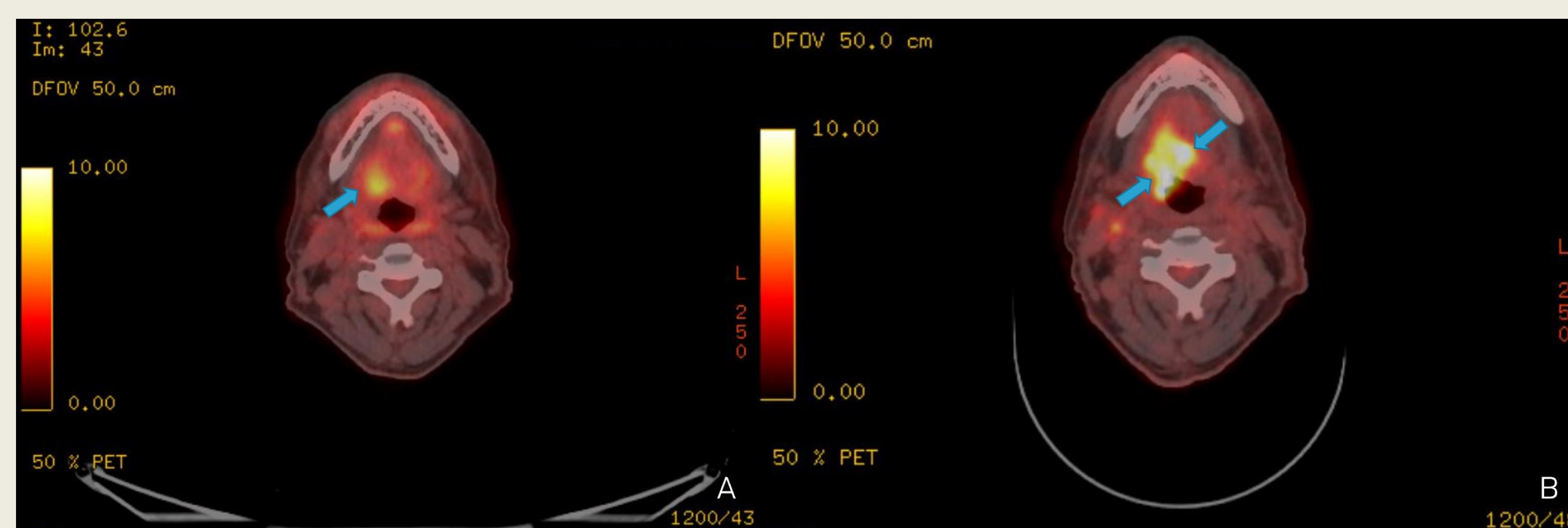
### Procedure

- The patient underwent salvage surgery to include near total glossectomy and bilateral neck dissection including right radical neck dissection.
- Submucosal SCC measuring 3.5 cm with extensive perineural invasion (PNI) was invading the root of the tongue requiring mandibulotomy with anterolateral thigh (ALT) free flap reconstruction.

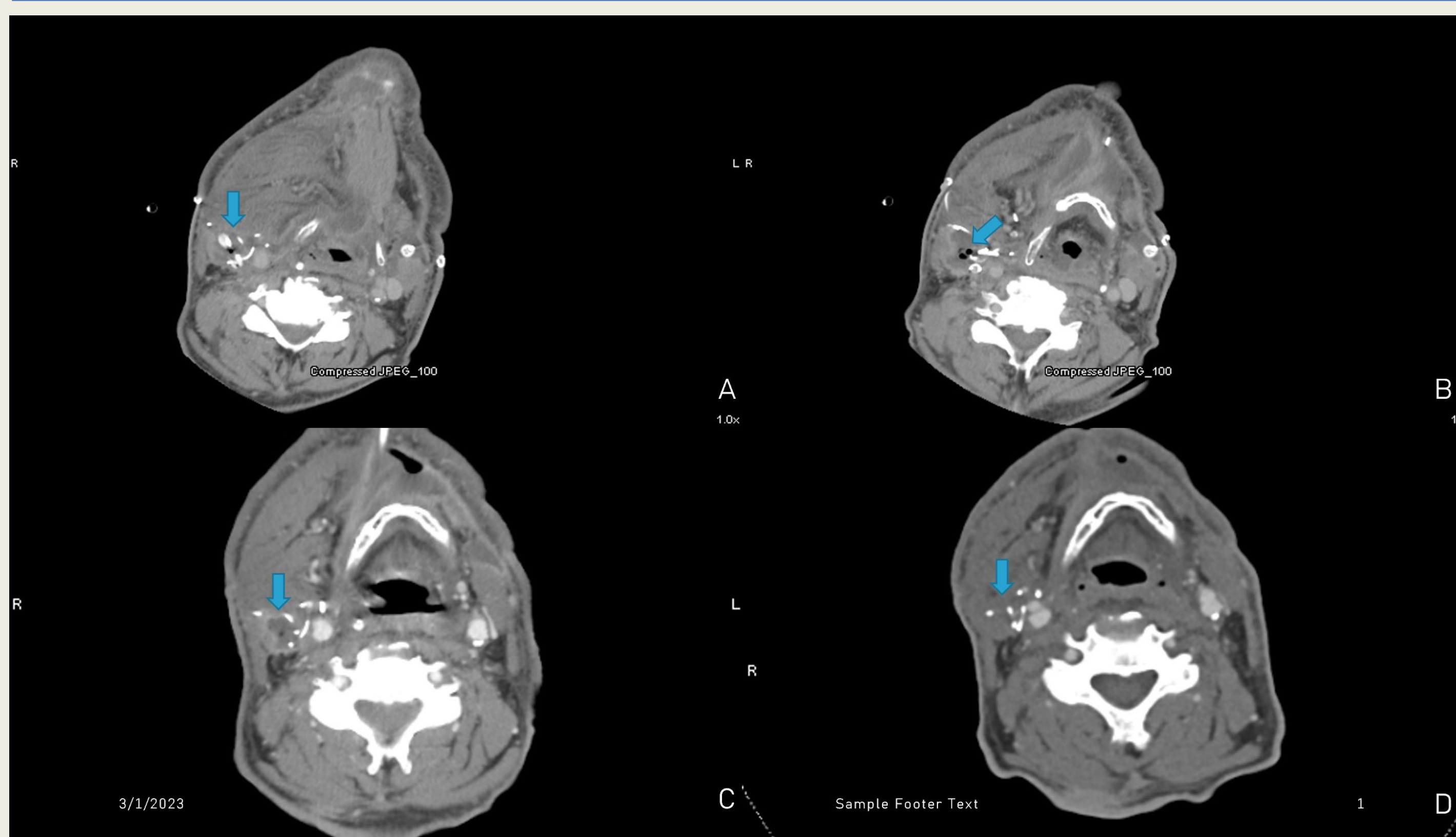
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**Figure 1A-B:** . PET/CT showed persistent activity within the right base of tongue which increased standardized uptake value (SUV) from 8.1 to 12.9 on interval imaging after 2 months.



**Figure 2A-D:** CT scans taken 9 days (Figure 2A-B), 24 days (Figure 2C), and 38 days (Figure 2D) post-operation.