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How to investigate the patient with halitosis

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Each month we present authoritative advice on the investigation of a common clinical problem, specially written for family doctors by the Board of Continuing Education of the Royal Australasian College of Physicians.

Definition

Halitosis is defined as malodorous breath that is unpleasant or objectionable either to the patient or to his or her relatives, friends or acquaintances.

Background

Over US$850 million is invested in the mouthwash industry in the United States every year.[1,2] Australian figures are not available. The harm caused by halitosis is purely psychosocial as there are no direct physical consequences (however, the cause of the halitosis may have other more harmful consequences). Commercial mouthwash and breath freshener advertisements continue to reinforce to the public the stigma of bad breath. The olfactory sense can fatigue and patients may become insensitive to their own halitosis, only being made aware of it by others.

In the past, treatment for halitosis has been difficult and frustrating for both patients and clinicians. With newer understanding of the mechanisms involved in the development of halitosis, treatment has become more effective.

Causes of halitosis

Halitosis is often the result of putrefaction and metabolism by anaerobic bacteria (*Treponema denticola, Bacteroides* and *Fusobacterium*). These bacteria degrade proteins, desquamated epithelium and haemopoetic cells in the oral cavity. Halitosis then results from release of sulfur-containing contaminants, including hydrogen sulfide, methyl mercaptan and dimethyl sulfide. These volatile substances are the breakdown products of the sulfur-containing amino acids cysteine and methionine.[3,4]

Oral causes

The most likely site of the source of halitosis is the mouth. Mouth disorders that may cause halitosis include periodontal disease, xerostomia, oral ulcers and aphthosis. Other causes of oral ulcers are also implicated, such as pemphigus and pemphigoid.

Poor oral hygiene or oral inflammation associated with smoking and alcohol consumption are also clearly associated. Chronic mouth breathing can lead to oral malodour by dehydrating the buccal mucosa and diminishing the antibacterial effect of saliva. Conditions in the teeth and gums that predispose to halitosis include food traps between the teeth and in dentures, gingivitis and poor oral hygiene.

A recent development in our understanding of halitosis has been the realisation that Gram-negative anaerobic organisms living in plaque in the posterior third of the tongue (anaerobic bacterial glossitis) can add significantly to the development and continuation of malodorous breath.[2,3] Here the organisms can flourish and remain out of the way of normal oral hygiene.

Nasal and maxillary causes

Halitosis can also be associated with disease of the nasal and maxillary passages, which drain into the

Investigation of halitosis

- History
  - Onset
  - Associated systemic features
  - Drug history
- Examination
  - Smell test to confirm malodour
  - Examination of buccal mucosa and tongue
  - Examination of dentition for caries and food traps
  - Exclusion of diabetes, renal failure and hepatic failure
- Further investigations
  - Dental consultation
  - Radiographic assessment of maxillary and nasal sinuses
  - Ear, nose and throat review
  - Gastrointestinal review

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oropharynx. For example, sinusitis may contribute to halitosis.

Gastro-oesophageal causes

Continuing down the gastrointestinal tract, other causes of bad breath include oesophageal disorders, such as neoplasm of the oesophagus. Gastric conditions, including gastric neoplasm and occasionally gastric ulceration, can be responsible for halitosis. With these conditions the halitosis is of relatively sudden onset and quickly becomes worse. Even faecal impaction and severe constipation can be a cause of halitosis in the elderly.

Reflux and regurgitation are accentuating factors when halitosis originates from the upper gastrointestinal tract. Recently, acute *Helicobacter pylori* infection involving the gastric lining has been implicated in some cases of halitosis. Poor motility involving the oesophagus or stomach, with delayed gastric emptying, can also be seen in patients with halitosis.

Other causes

In some patients, a pulmonary source of halitosis is likely. Bronchiectasis and lung abscess need to be considered in these patients.

Some systemic conditions may cause halitosis. For example, patients with uncontrolled or undiagnosed insulin-dependent diabetes mellitus may have a characteristic acetone breath. Patients with advanced renal failure have a characteristic uraemic musty odour to their breath. The hepatic fetor of liver failure is a well known clinical sign in general medicine.

Other factors which may complicate halitosis include dehydration, excessive coffee consumption and diet (for example, excess intake of garlic and other sulfur-containing foods). Any drug which decreases salivary flow may add to the development or maintenance of halitosis. Smoking and alcohol decrease salivary flow and thus reduce one of the key mechanisms for flushing the oropharynx.

Investigation

History

The history should include the length of time that the problem has been present, whether weight loss is a feature, whether digestive disturbances are present and if there are any associated systemic conditions. A full smoking and dietary history is also required. Consider age of onset, weight loss, any self-perceived foul taste, body language, nonverbal hints from others and direct verbal corroboration from relatives and friends.

Associated xerostomia should also be noted. Common causes of xerostomia include medications such as antihypertensives, diuretics and antidepressants. If the patient is very busy during the day and has little time to drink water, the resultant dry mouth can be a factor in halitosis.

Exclusion of psychiatric disorders – for example, 'olfactory reference syndrome' – is important. Some patients imagine the oral malodour. Psychotic patients can even perceive that the malodour has been placed upon them. The olfactory reference syndrome mainly affects young single males and is characterised by an ongoing search for a medical solution to an imaginary halitosis (which is unattainable without psychiatric assistance). These patients are delusional and diagnostically have a condition much closer to schizophrenia than depression.

Examination

Sniff test

Often the careful physician can detect the patient's fetid breath. For proper examination the patient should be advised to refrain from food, breath fresheners and oral hygiene for 12 hours prior to the examination. Scented cosmetics, onion and garlic should be avoided for 24 hours, and antibiotics should be withdrawn for 48 hours prior to the consultation.

To perform a sniff test, instruct the patient to take a full inspiration and then exhale through the nasal sinuses. If odour is noticed in the nasal expiration, the origin of the halitosis may be the nasal cavities.

Next, ask the patient to hold the nose and breathe out through the mouth. Sniff the early expired air to check for an oropharyngeal cause. Then ask the patient to take another full breath and breath out deeply through the mouth. Sniff the end of the exhaled breath. Odour in the end expiratory air can be a clue to a cause deeper within the lungs, such as bronchiectasis or a lung abscess.

A 2 x 2 cm square of gauze can be applied to the midline of the dorsoposterior border of the tongue and drawn anteriorly with finger pressure for 2 cm. The gauze is then removed and sniffed by the examiner. It may also be helpful to floss between all the posterior teeth, sniffing the floss each time.

Physical examination

The oropharynx is then examined. It is essential to examine the back of the tongue with a mirror to search for plaques. The colour of the tongue should be the same as that of the oral mucosa. If the tongue is white, creamy or brown, suspect glossitis.

Dryness of the mouth is checked by looking at the buccal mucosa and by running a gloved finger or cotton over the area to see if it adheres. The patient's dentition should be assessed, looking for food traps and poor dental hygiene.

The ears, nose and oropharynx should be examined with an otoscope and tongue depressor. Look for acute or chronic upper respiratory illnesses, postnasal drip and nasal polyps. Finally, exclude systemic diseases,

Commonwealth Department of Health and Family Services

General Practice Evaluation Program Grants for Evaluation Research

The goal of the General Practice Evaluation Program (GPEP) is to examine if changes to general practice have improved the quality and value of care in general practice and the wider health system.

Applications for grants are sought from researchers including individuals, organisations or research teams from any relevant discipline, including health and medical research, behavioural sciences, health economics and social sciences. Researchers are encouraged to seek funding for projects which are multi-disciplinary in approach including general practitioners and consumers in the design and conduct of the relevant evaluation.

The key areas under the program for evaluation research in general practice are: supply and distribution, service characteristics, practice organisation, quality, education/training, ethical/professional/legal, health services interface, financial and methodology. Further information on key areas for research is available from the Departmental address below. Applicants are encouraged to develop proposals in line with the current direction of the GPEP which is increasingly focused on specific research relevant to the monitoring and evaluation of general practice and the General Practice Strategy.

Grants are available under two categories:

1. Project Grants

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Project Grants - are intended for comprehensive evaluation research and may include projects for a duration of up to three years.

Seeding Grants - are awarded for a maximum of $15,000 for up to one year and are intended to:

- encourage researchers who are new to general practice research;
- identify or clarify general practice research questions;
- design and/or pilot innovative methodologies; and
- identify fruitful directions for future research.

Applications for both grant categories close on 27 February 1998.

Information and application forms may be obtained from the Evaluation Section, MDP 29, General Practice Branch, Department of Health and Family Services, GPO Box 9848, CANBERRA ACT 2601 or telephoning (02) 6289 3661 or Fax (02) 6289 8621

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including diabetes, hepatic failure, renal failure and Sjögren's syndrome.

Further investigation

If the cause of halitosis is still undiagnosed after taking a thorough history and performing a careful examination, the following investigations may be useful.

Dental consultation

A complete dental examination by a dental practitioner with an interest in halitosis can be helpful. The dentist can confirm the state of the patient's dentition and gums and search for anaerobic glossitis.

Radiographic assessment

X-rays of the nasal and maxillary sinuses, and CT scans of the sinuses, can be useful in excluding sinusitis, polyps and neoplasms.

Ear, nose and throat review

Review by an ear, nose and throat specialist may be necessary to exclude postnasal drip.

Gastrointestinal review

Review by a gastroenterologist may be necessary to exclude upper gastrointestinal malignancy, peptic ulceration and systemic disease.

Treatment

If the sinuses are found to be the source of halitosis, the patient should be reviewed by an ear, nose and throat specialist. If *H. pylori* infection is present it should be treated. Reflux should also be treated if present.

Reduction of smoking and of excessive alcohol and caffeine intake should be routine. Adequate fluid intake is important and an intake of at least two litres a day is suggested. These measures help to prevent dry mouth and reduce the 'pungency' of the saliva.

If food traps in the mouth are the cause, they should be corrected if possible with dental consultation and the patient should be reviewed by an oral hygienist. Patients should be educated regarding flossing and brushing techniques. Flossing is of prime importance for removing substrate debris from between the teeth and should be performed twice a day. Brushing the back of the tongue with a toothbrush is also essential and, again, should be performed twice a day.

Many of the currently popular mouthwashes and toothpastes are ineffective against oral malodour. The masking effect they provide is short lived and they exacerbate xerostomia because of the alcohol they contain.

Apart from flossing, the main advances in the treatment of halitosis have been regular brushing of the back of the tongue and subsequent rinsing of the mouth with prepared chlorine dioxide mouthwashes in cases where posterior anaerobic glossitis has been diagnosed. Chlorine dioxide oral hygiene products are now available in Australia. Low concentration chlorine dioxide products have been shown by a number of American dental researchers to be effective in destroying odorous molecules for up to five hours after use.[2]

Conclusion

In most cases, halitosis arises from a cause in the mouth, but consideration of other causes may be necessary. A summary of the investigation of the patient with halitosis is provided in the box on page 64. Armed with flossing material, a toothbrush that can reach the back of the tongue and chlorine dioxide mouthwash for resistant cases, most cases of halitosis can now be successfully treated. ■

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