Anticholinergic burden and oral health

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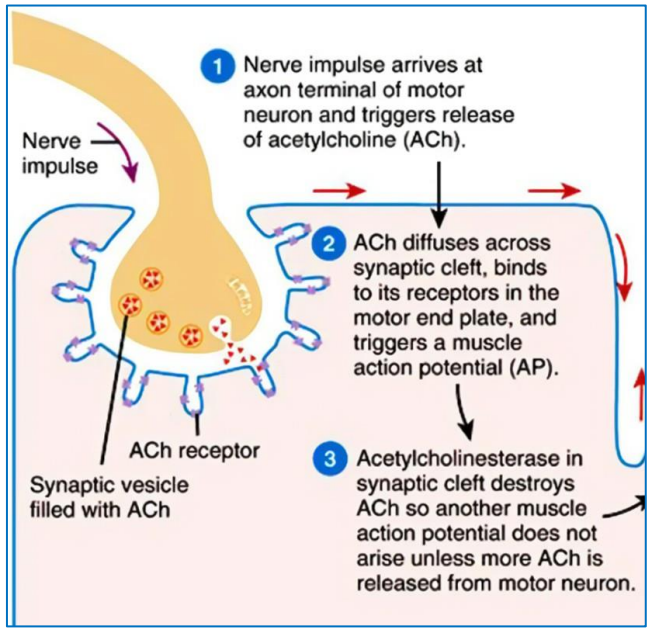
Aims of this presentation

By the end of this presentation you should be able to:

1) have an overview of anticholinergic burden and its pathophysiology
2) understand its implications for oral health
3) implement prevention and treatment strategies for it

What is acetylcholine?

- Acetylcholine is a neurotransmitter that has a role in the regulation of movement, thought and emotions.
- It works through two types of receptors- muscarinic and nicotinic.
- Muscarinic receptors function in the **peripheral and central nervous system and are present in various body organs**
- Nicotinic receptors function in the **central nervous system and the neuromuscular junction.**



Anticholinergic drugs: facts and figures

- In the UK, the proportion of patients per month prescribed at least one medication with anticholinergic properties increased from **6.1% in 1989 to 18.6% in 2016.**

- This may be, at least partly, owing to

➢ increased prescription rates of drugs for urinary incontinence and overactive bladder

➢ increased prescription rates for antidepressants

Anticholinergic medication indications

There are more than 600 medications with anticholinergic properties, including:

- Those that are prescribed primarily for their anticholinergic effect
- Those that are primarily prescribed for other reasons, but also have anticholinergic effects

Medication primarily prescribed for its anticholinergic effect

Examples of medication primarily prescribed for its anticholinergic effect

- Treatment of urinary incontinence (e.g. oxybutynin)
- Treatment of Parkinson's disease (e.g. trihexyphenidyl hydrochloride)
- Treatment of extrapyramidal side effects induced by psychotropic medication (e.g. procyclidine)
- Treatment of hypersalivation (e.g. hyoscine hydrobromide)
- Treatment of gastrointestinal spasms (e.g. hyoscine butyl bromide)
- Treatment of chronic obstructive pulmonary disease (e.g. glycopyrronium bromide)
- Treatment of anterior uveitis in the eye and in cycloplegic refraction (e.g. atropine sulfate)

Medication with anticholinergic properties prescribed for other indications

Examples of medication with anticholinergic properties that is primarily prescribed for other indications

- Antipsychotics (e.g. clozapine)
- Antidepressants (e.g. amitriptyline, paroxetine)
- Antihistamines (e.g. chlorphenamine, promethazine)
- Analgesics for neuropathic pain (e.g. nortriptyline)
- Opioid analgesics (e.g. codeine)
- Medication for cardiovascular disease (e.g. disopyramide)
- H2 receptor antagonists (e.g. ranitidine)
- Anticonvulsants (e.g. carbamazepine)
- Anxiolytics (e.g. benzodiazepines)

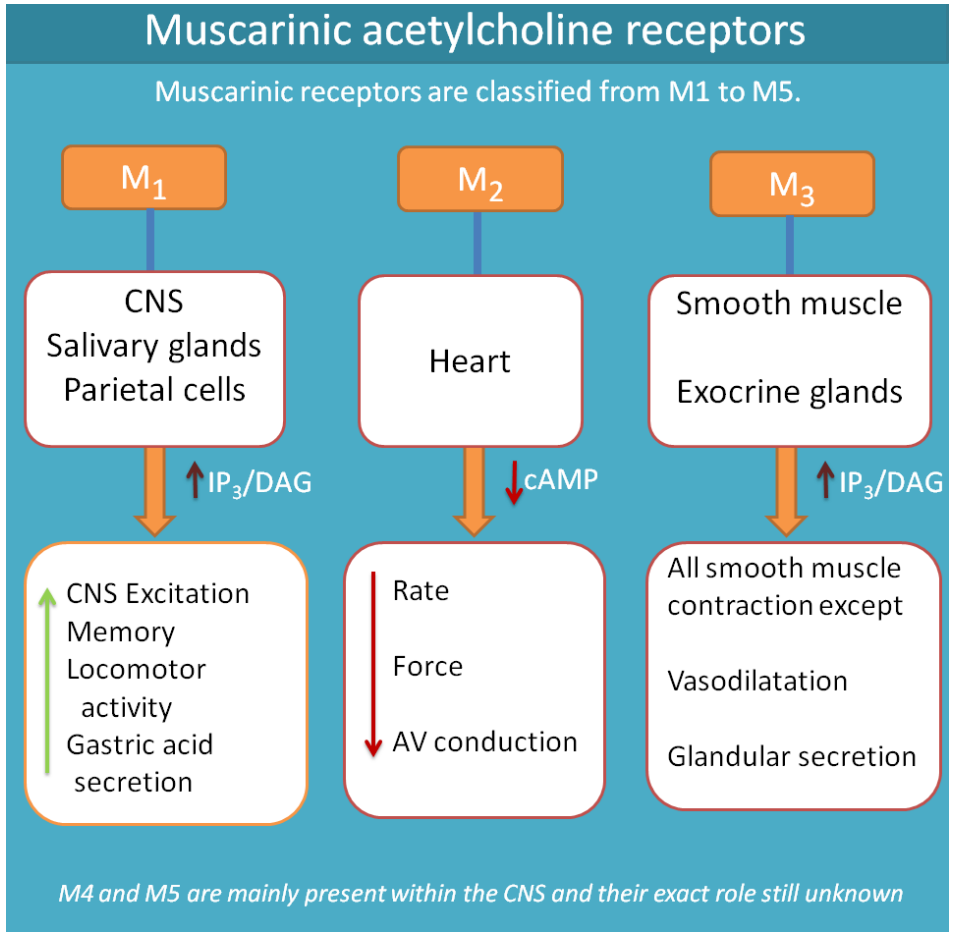
Vulnerable groups

- All patients prescribed anticholinergic medication are vulnerable to anticholinergic side effects.

- Three groups are particularly vulnerable:
  - Older people
  - People with learning disabilities
  - People with mental health conditions

- For many people within these vulnerable groups, the anticholinergic effect is from medication prescribed not primarily for their anticholinergic property.

Anticholinergic burden and pathophysiology



Anticholinergic drugs act on muscarinic acetylcholine receptors. There are five subtypes of the muscarinic receptors:M1, M2, M3, M4 and M5.

Side effects

- Many patients tend to be on several drugs with anticholinergic properties at any one time.
- This concomitant use increases the risk of side effects.

- **The cumulative effect of taking one or more medications with anticholinergic activity is referred to as the anticholinergic burden (ACB)**
- Common side effects linked to ACB can be the cause of significant morbidity and mortality.

Side effects linked to ACB

- Dizziness
- Blurred vision
- Increased risk of falls
- Urinary retention
- Constipation
- Dry mouth
- Nausea
- Increased heart rate
- Dry eyes
- Narrow-angle glaucoma
- Sedation
- Vascular events
- Cognitive impairment
- Delirium
- Dementia

ACB

- ACB is particularly pronounced in the vulnerable patient groups mentioned previously.
- For example, patients with mental health conditions, such as psychosis, often experience a prescribing cascade.
- First, they are treated with antipsychotic medications, many of which have inherent anticholinergic properties, and if they develop extrapyramidal side effects owing to the antipsychotic, they are also prescribed anticholinergics, thus creating a cumulative effect

ACB

- Another example is adults with an intellectual disability with behaviour that challenges and co-existing mental health conditions, such as depression or psychosis.
- They are often prescribed antipsychotics, antidepressants and/or mood stabilisers in combination, many of which have anticholinergic properties
- In addition, many of these patients develop extrapyramidal side effects because of antipsychotic medication use and are then prescribed more anticholinergic drugs to combat this.
- Any over-the-counter medication with anticholinergic effects (e.g. antihistamines) could make this worse.
- Overall, the prescription of anticholinergics appears to start early in this population and continues for several years

ACB

- Owing to sedation and delirium as a result of ACB, the risk of adverse outcomes, including falls and hospitalisation, increases with increasing anticholinergic exposure
- Cognitive impairment is another aspect of ACB that has been studied extensively
- Cumulative use of strong anticholinergics is associated with a higher risk for dementia

Measuring ACB

Measuring anticholinergic burden

- No gold standard tool to measure ACB

- Several available instruments
  - Anticholinergic Effect on Cognition (AEC) scale
  - Anticholinergic Risk Scale (ARS)
  - The ACB calculator

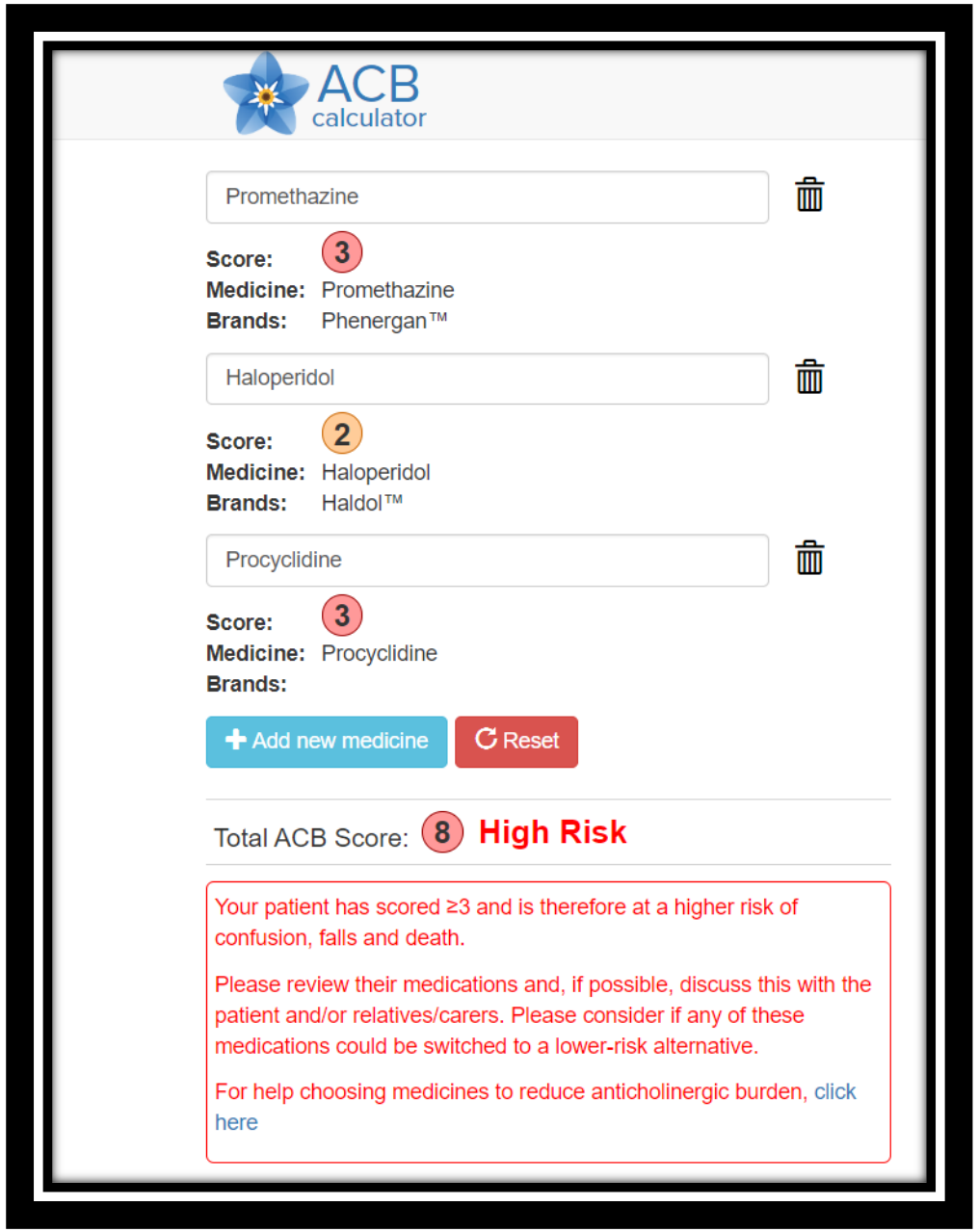
The ACB calculator

https://www.acbcalc.com

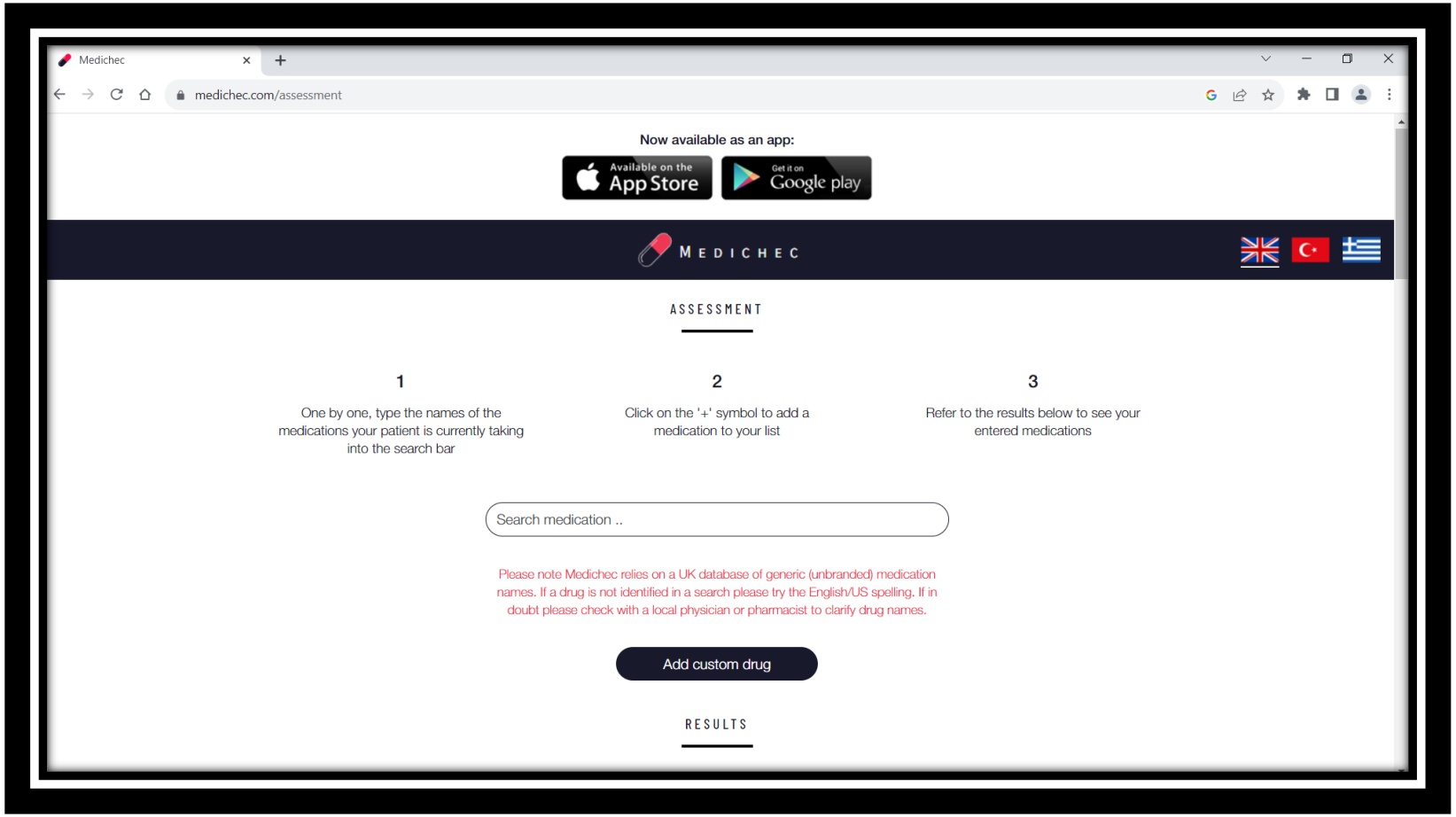
- Entering the name of the medication into the calculator automatically generates a score from 0 to 3.
- Drugs with no anticholinergic effects score 0, drugs with possible anticholinergic effects score 1 and drugs with definite anticholinergic effects score 2 or 3
- A score of 3+ on this calculator is associated with increased cognitive impairment and mortality

Weblink: https://www.acbcalc.com

Example on the ACB calculator webpage



AEC SCALE USING medichec.com



Oral Health

- The side effects of anticholinergics can frequently affect oral health.
- In 2016, the FDI World Dental Federation stated that "oral health is multi-faceted and includes the ability to speak, smile, smell, taste, touch, chew, swallow and convey a range of emotions through facial expressions with confidence and without pain, discomfort, and disease of the craniofacial complex"
- There is a significant correlation between ACB and the presence of xerostomia (i.e. dry mouth)

Dry mouth

- Dry mouth is experienced subjectively by the patient as a symptom and can be demonstrated objectively by measuring the salivary output.
- Normal salivary function is essential in speech, digestion, and swallowing.
- Anticholinergics alter the stimulation of saliva and reduce the salivary flow. The alteration of saliva's various protective functions in the oral cavity leads to more oral health problems.
- A reduction of 5% saliva flow may happen before patients become aware of their oral health problems.

Oral health problems to serious consequences

- Oral health problems can, in turn, lead to a range of serious health consequences, including
  - Diabetes
  - Cardiovascular disease
  - Cancer

- Early identification and intervention to address these oral side effects is therefore important.

- We need to **educate patients** about dry mouth and its causes, consequences and management; **make referrals** to appropriate service providers, such as dentists, dental hygienists, psychiatrists and GPs; **support hospitals** with mouth care policies and audits; and **signpost patients** to appropriate dental services on discharge from hospital

Prevention and treatment strategies

- Pharmacists can contribute to the prevention and intervention of anticholinergic side effects on oral health in several areas.
- Medication reviews conducted by primary care and hospital pharmacists can identify all drugs with potential anticholinergic effects.
- Additionally, medicines optimisation can assist by reducing or eliminating anticholinergic polypharmacy, based on advice to prescribers from primary care or hospital pharmacists.
- Prescribers can also use medication with a lower ACB score and prescribe only if needed, particularly in high-risk groups.

Prevention and treatment strategies

- Once anticholinergic drugs have been prescribed, pharmacists should:

✓Teach the patient self-monitoring and providing specific advice on how to seek help (e.g. reporting dry mouth symptoms to a pharmacist, dentist, GP, treating psychiatrist, etc.)

✓Ensure regular reviews of efficacy and monitor for side effects

✓Address any side effects proactively, including lifestyle changes (such as reducing intake of acidic drinks, alcohol, caffeinated drinks, tobacco and substance misuse, as these can cause poor oral health)

✓Advise on use of frequent sips of water throughout the day to relieve dry mouth, sugar-free chewing gum to stimulate salivary flow and use of mouth moisturising products

✓Consider deprescribing of anticholinergic drugs, if clinically appropriate

Advise for patients to promote good oral hygiene

- Brush twice daily with pea size amounts of high fluoride (5,000 parts per million) toothpaste to help remineralise teeth and prevent or slow decay.
- Advise patients to spit out but not to rinse, so product stays on teeth
- Restrict sugar intake to twice daily and ensure the intake time is as short as possible
- Floss twice per day with interdental brushes
- Encourage service users to have regular (three to six monthly) dental appointments

Advice from the World Health Organization

Dry mouth products

- Patients may use dry mouth products or mouth moisturising products, including gels, sprays, and toothpastes e.g.
- Biotene products, Bioxtra gel/spray/toothpaste
- Glandosane spray
- Saliva Orthana spray
- Saliveze oral spray
- The gels can be applied to all parts of the mouth, including the lips, tongue and cheeks, and should be slowly massaged into the tissues

Dry mouth products: new research areas

- In addition, dental services may recommend **fluoride varnish and amorphous calcium phosphate** — fluoride dental varnish either with or without amorphous calcium phosphate has the potential to arrest/reverse root caries, especially non-cavitated lesions for patients with xerostomia

- A recent study showed some beneficial effects for **oral pilocarpine drops** to relieve xerostomia in older people

- There is also some recent evidence that **1% malic acid topical sialogogue spray** is an effective method for the treatment of xerostomia.

Best practice

- Pharmacists should carefully consider if the patient is in a high-risk group for ACB (e.g. older, cognitive deficits, intellectual disability, mental health condition).
- Wherever possible, there should be a careful discussion between the prescriber and patient about the risks and benefits of anticholinergic medication.
- This can involve summarising the reasons for the prescription, response to the medication, adherence, side effects and patient's views about continuing the medication. If the patient lacks capacity to participate in such a discussion, the principles of best interest decision making should be followed.

Best practice: important questions to ask

Before deciding to commence or continue treatment with a drug with anticholinergic effects, consider the following:

- Have non-pharmacological strategies been optimised?
- Has the option of treating the condition using drugs without anticholinergic effect or with lower anticholinergic potential been considered?
- Has there been a review to minimise co-prescribing of other drugs with anticholinergic properties (including over-the-counter medicines such as antihistamines)?

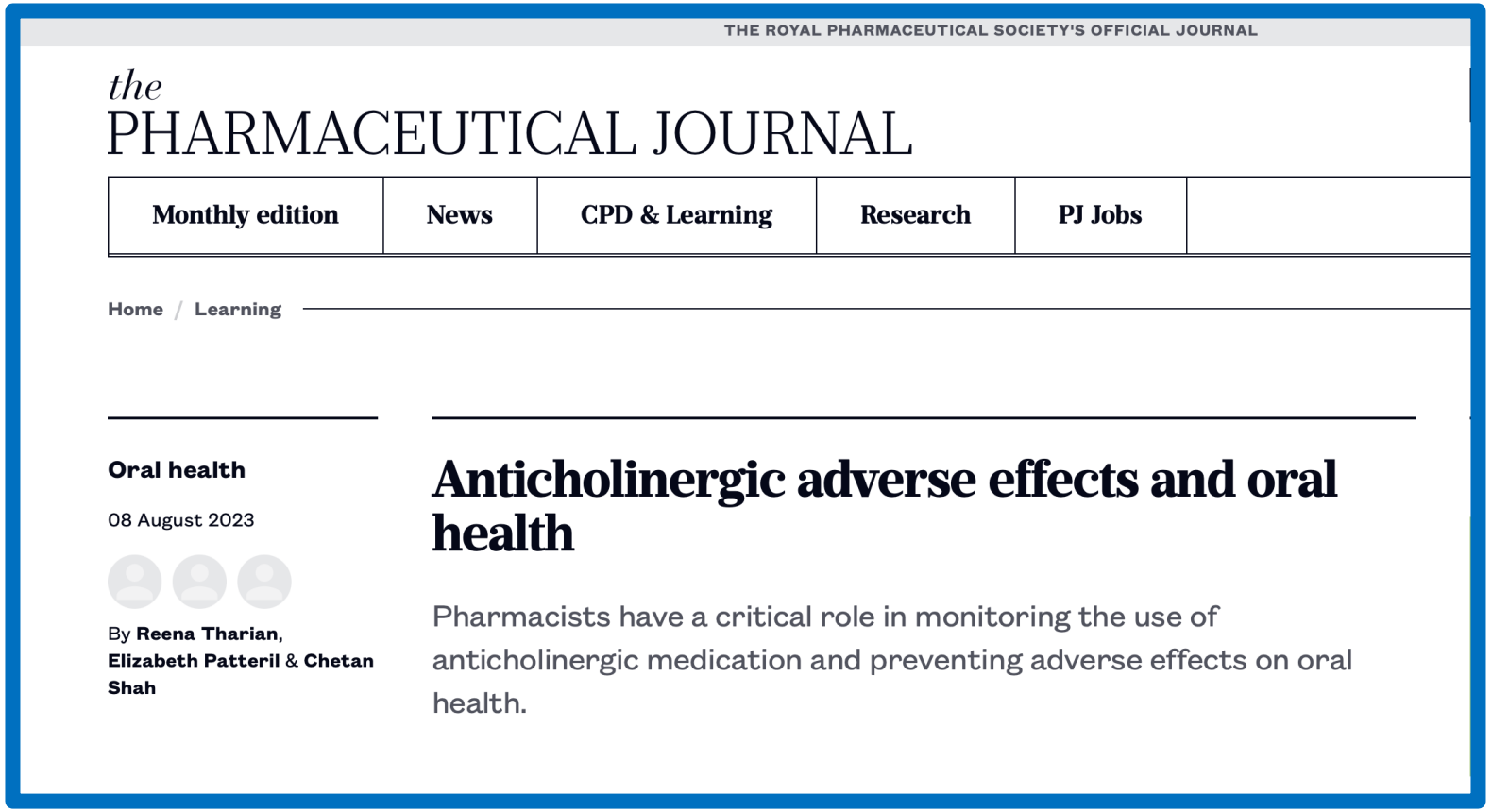
Summary

- Many patients, particularly older people, those with intellectual disability and those with mental health conditions, are on several drugs with anticholinergic properties at any one time.
- This concomitant use increases the risk of side effects and the cumulative effect of taking one or more medications with anticholinergic activity is referred to ACB.
- Side effects related to oral health are among the most common manifestation of this.

Summary

- There is a sequence of events ranging from xerostomia through to periodontal disease, caries, dysphagia, dysgeusia and increased risk of inflammation and infections.
- These can in turn lead to a range of serious health consequences, including diabetes, cardiovascular disease and cancer.
- Pharmacists have a crucial role in advising patients and prescribers about prevention, early identification and treatment of these oral side effects.

https://pharmaceutical-journal.com/article/ld/anticholinergic-adverse-effects-and-oral-health



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Oral health

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By **Reena Tharian, Elizabeth Patteril & Chetan Shah**

Anticholinergic adverse effects and oral health

Pharmacists have a critical role in monitoring the use of anticholinergic medication and preventing adverse effects on oral health.

Thank you for listening

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