

Anticholinergic and Delirium

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Abstract

The purpose of the literature review is to discuss the effects of anticholinergics in health care clients. Researchers demonstrated the impact of acetylcholine and cholinergic burden can result in cognitive decline and dementia. Their research substantiated recommendations from the World Health Organization (1993) to avoid anticholinergics in those persons over the age of 65 years. Health care providers prescribe anticholinergics for a variety of reasons: Parkinson's disease; pre-operative medications to reduce secretions; urinary retention or antispasmodics for gastrointestinal disturbances. Other over the counter medications, such as antihistamines also have anticholinergic effects adding to a problematical anticholinergic burden. Common side effects cited for anticholinergics included not only confusion, delirium, and sedation, but also dizziness, dry mouth and blurred vision. As a health care provider, it is important to recognize the effects of anticholinergics and how they specifically impact our geriatric population.

Keywords: Dementia; Delirium; Geriatrics; Anticholinergic; Cholinergic; Antimuscarinics

World Health Organization

According to the World Health Organization (1993) per the ICD-10 Classification of Mental and Behavioral Disorders for diagnostic criteria for research, delirium not induced by alcohol or other psychoactive substances can result in multifactorial responses, such as "clouding of consciousness, disturbance of cognition, or alteration in memory recall." Psychomotor disturbances can result in "hypo or hyperactivity, increased or decreased flow of speech, insomnia and even disturbing dreams [1-4]." According to Naja et al. specific physiological changes occurring in the elderly weakens cholinergic activity and increases the permeability of the blood-brain barrier. Specific attributes of Alzheimer's disease and dementia include cholinergic deficits [1]. The role of acetylcholine in the central nervous system integrates cognitive processes, such as memory, motor skills and learning. So when the cholinergic activity is reduced, anticholinergic or antimuscarinic activity returns to the forefront turning the switch off for cognitive functioning. The researchers advocate for the interdisciplinary team to become vigilant in the reduction of the anticholinergic burden (AB) by applying the Beers criteria in the clinical practice.

According to Yayla et al. a cholinergic deficit creates an acetylcholine imbalance in the system. When increasing the additive effect of an anticholinergic, further imbalances are created [2]. The Beers criteria (2012) made note that anticholinergics had a causal relationship to dementia and cognitive decline, thus, should be avoided in persons over the age of 65.

Health care providers need to be aware of the culmination of the pharmacokinetic properties of the anticholinergics. Anticholinergic drugs are frequently prescribed for overactive bladders, Parkinson's disease, and gastrointestinal disorders. Multiple prescriptions increase the risk of anticholinergic effects in the elderly, not only will the patient experience cognitive declines, the Pharmacokinetic properties also result in patient drowsiness with disruption in the person's ability to see. The culmination of the anticholinergic properties can create the perfect storm resulting in a fall.

Vrolijk et al. described anticholinergic accumulation in the elderly manifesting with alterations in the brain neurochemistry. Accumulations were shown to be a result from multiple medications with anticholinergic properties often prescribed to the patient

population [3]. The researchers discussed the Anticholinergic Cognitive Burden ACB scale which measures cognitive effects on a range from one to three with three showing the most severe clinically relevant cognitive effects. Research conducted by Vrolijk et al. reviewed delirium and hospital costs showing the cognitive burden placed a financial burden on the hospital financial resources through increased lengths of stay and nurse patient/ratio on time spent per day.

It was also revealed that the combination of three drugs may lead to anticholinergic accumulation. The researchers also screened food supplements identified as having abilities to cross the blood-brain barrier. They were glucosamine, Vitamin B6, Vitamin B12, Vitamin C, chondroitin, zinc, choline, quercetin and Vitamin B4.

Comparisons showed an ACB score of one indicating they have a low risk of adverse cognitive effects.

Mintzer and Burns discussed the rise in percentages of nursing home residents compared to elderly people living in the community who receive drugs with antimuscarinic or anticholinergic effects [5]. Anticholinergic drugs included those prescribed as antiemetics or antivertigo, antiparkinson, antispasmodics, anti-migraine drugs, bronchodilators, pre-anesthetics, mydriatics or cyclopegics. There is also a widespread use of drugs that have anticholinergic side effects which must be viewed with cautions. Examples given were antiarrhythmics, antidiarrheals, antihistamines, skeletal muscle relaxants, anti-ulcer drugs, antidepressants, and antipsychotics. Mintzer and Burns commented on the anticholinergic potential with is also increasing. Many medications are difficult to monitor because they are available without prescription. One medication that has caused concern and has gone under the radar is Cimetidine or Tagamet. It is reported that Cimetidine has the highest anticholinergic effect in vitro. So, if an elderly person receives other anticholinergics, the

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additional activity of Cimetidine could be problematical. As a health care provider, Mintzer and Burns recommend to minimize or change the combination of anticholinergics [5].

According to Lee et al. delirium is a neuropsychiatric disorder which occurs across the health continuum [6]. The geriatric population (greater than age 65) is especially susceptible to adverse outcomes, so health care providers need to be vigilant when assessing and treating delirium in the geriatric population. Delirium can manifest by a decline in cognition, attention or consciousness. Lee et al. discussed medications used to treat delirium symptoms. Examples given were atypical and typical antipsychotic medications, cholinesterase inhibitors, antidepressants, benzodiazepines, and gabapentin. Lee et al. suggest that pre-existing deficiencies in cholinergic activity or transmission may be a contributing factor to delirium. Caution must be used when prescribing typical antipsychotic, such as haloperidol for delirium symptoms due to its association with extrapyramidal symptoms. Researchers explored alternative atypical antipsychotics, such as olanzapine, quetiapine and risperidone have shown to be as effective when treating delirium. The researchers found no significant differences when comparing typical and atypical antipsychotics. The data collected were inconclusive in determining the effectiveness of atypical antipsychotics when treating the elderly.

They reported the study results showed the use of antipsychotics to treat delirium in the geriatric population were inconclusive. Anticholinergic side effects cited included confusion, cognitive and functional deficits. The anticholinergic side effects also can contribute to sedation, hypotension, dizziness, falls, and urinary incontinence with increased risk of urinary infections. The clinical presentation of these potential side effects will make it necessary to have further studies to clarify benefits on the use of antipsychotic medications when treating the geriatric population.

Marcum et al. studied the association among anticholinergics, including over the counter use, and falls [7]. Marcum et al. discussed the incidence of fall rates and their recurrence. Etiological factors are intrinsic and extrinsic. Medication classifications with central nervous system side effects can be precipitating risks for falls and fractures. Anticholinergic effects can cause dizziness, sedation, cognitive impairment, as well as blurred vision. Any one of these factors could preclude an adverse event. The study included postmenopausal women where the participants self-reported falls and current prescription use. Medication classifications identified were antihistamines, antidepressants, gastrointestinal antispasmodics, urinary antimuscarinics, antivertigo, antiemetic's, skeletal muscle relaxants, antipsychotics, and antiparkinson agents.

Marcum et al. found there was an association with medications identified with strong or moderate anticholinergic effects and recurrent falls in postmenopausal women. Associations increased dependent on length of use and polypharmacy of anticholinergic products. Marcum et al. also discussed the prevalence of antihistamines over the counter contributing to adverse anticholinergic effects. Anticholinergic effects not only include cognitive decline, but memory impairment, constipation and urinary retention. Researchers suggested that health care providers need to be cognizant of the adverse effects when prescribing and look into alternative methods of treatment. There also needs to be an increased awareness of the fall risk in anticholinergics available over the counter medications, such as diphenhydramine.

Summary

Research demonstrated the role of acetylcholine and cholinergic

burden that occurs in anticholinergics can result in cognitive decline and dementia and should be avoided in those persons over the age of 65 years which aligned with the recommendations by the World Health Organization. Vrolijk et al. also demonstrated that combinations of food supplements known to cross the blood brain barrier have minimal effects on cognitive decline.

Mintzer and Burns reviewed the anticholinergic side effects and the prevalence of anticholinergic administration for a variety of comorbidities. Mintzer and Burns discussed the clinical manifestations of side effects of anticholinergic properties often seen in over the counter drug stores, such as Cimetidine (Tagamet). Recommendations included finding alternatives to combinations of anticholinergic medications. Marcum et al. described study results when comparing anticholinergic properties and their use in post menopausal women and falls. Study results showed associations between falls and anticholinergics were increased dependent upon the length of use of anticholinergics and polypharmacy of anticholinergic products. Lee et al. reviewed delirium and its treatment with antipsychotics, typical and atypical. It was noted that health care providers need to be cautious when prescribing haloperidol due to its extrapyramidal side effects. The researchers reported inconclusive evidence that atypical or typical antipsychotics were more beneficial than the other. As a health care provider, one needs to be cognizant of current research literature. The above literature review depicts a glimpse of anticholinergics, its burden and side effects. As shown in the research, cognitive decline or delirium does not stand alone in the pocket of side effects. Anticholinergics also go beyond the prescription pad; they are in the grocery and drug stores.

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