Salt in effervescent and dispersible medications: prescriber beware

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Salt is ubiquitous in modern society and we have developed an addiction to salt that has adversely impacted public health not only in ‘developed’ nations but also in poorer nations that have acquired a taste for high-salt, high-fat, Western fast-food diets. Whether through the widespread presence of salt shakers on every dining table of homes and restaurants or whether in hidden form as seen in many processed foods, salt consumption has increased in most nations and governmental efforts to reduce consumption have met with mixed success.1-4

Public health measures have, quite rightly, focused on reducing sodium content in foods with the introduction of measures such as the traffic-light system championed by groups such as Consensus Action on Salt and Health (CASH).5

It has been estimated that a 3g per day reduction in salt (1.2g sodium) would prevent 30,000 cardiovascular events and save the NHS at least £40 million a year.6

The not-so-well-known problem with salt in medicines

The presence and amount of sodium in medications has not been widely appreciated either by governments or the health profession, and therefore its impact on health had not been previously evaluated until a recent study by our group.7 It was sobering to discover just how much salt some preparations contained (mostly in bicarbonate form that dissociates to form carbon dioxide bubbles when in contact with water that causes the ‘fizz’). This leaves the sodium in the glass of water, ready to be ingested along with the active drug ingredient.

As an example, the recommended sodium intake for an adult in the UK is 2.4g per day (104mmol). However, some dispersible and effervescent formulations of paracetamol 500mg can contain 18.6mmol and 16.9mmol of sodium in each tablet respectively and therefore the maximum daily dose of eight tablets results in the ingestion of 148mmol and 135mmol of sodium respectively.

In fact in our study the mean sodium consumption from these medications was 106mmol daily, which exceeds the recommended total daily allowance of sodium for one medication alone. Added to a typical Western diet, these medications, especially in combination, could result in very high sodium intake.

The implementation of guidance for manufacturers to display the sodium content of medicines is variable. Sodium content is absent from the accompanying Summary of Product Characteristics of most of these medications and the only way of obtaining the actual content per tablet is to contact the manufacturer.

Interpreting the data

The data from our study was analysed comparing long-term rather than short-term use of these formulations. We studied 1.29 million patients with an average follow-up time of 7.23 years. There were 61,072 incident events during the study period and those subjects experiencing a cardiovascular event were 16 per cent more likely to have used preparations containing sodium (OR 1.16, 95% CI 1.12-1.21).

Perhaps unsurprisingly, given the strong association between sodium and blood pressure, this was associated with a 22 per cent increased risk of nonfatal strokes (1.22, 1.16-1.29). In fact there was a seven-fold increase in new cases of hypertension (7.18, 6.74-7.65) associated with sodium-containing medicines, which fits well with a biologically plausible mechanism.

The other significant finding was a 28 per cent increased risk of all-cause mortality (1.28, 1.23-1.33).

Conclusions

So what conclusions can we draw from these findings? Firstly, these formulations may not be as benign as we may have previously assumed. They are likely to increase the risk of hypertension-driven cardiovascular events due to their high sodium content.

Therefore, the long-term prescription of these formulations should be done with care and patients who are taking them should certainly be monitored for the emergence of hypertension.

Patients who are already at risk of cardiovascular events and those on a low-salt diet, eg chronic heart failure, should avoid these formulations as far as practicably possible. Ideally, the prescription of these formulations should only take place once a discussion has taken place between the prescriber and the patient regarding the balance of risks and benefits.

An important caveat to note with these findings is that we were not able to control for dietary sodium. However, as the controls were matched for factors including the general practice attended, it is likely that they mirror the lifestyles and diets of cases.

A further question of interest is the impact of long-term use of over-the-counter medications and vitamin supplements in effervescent, dispersible and soluble formulations.

What is certain is that an increased awareness of these potential risks by physicians may help reduce the incidence of iatrogenic hypertension-driven cardiovascular events, particularly in at-risk patients.
References

Declaration of interests
None to declare.

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