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Letter to the Editor

PROTECT – PUSH – PISS! A novel mnemonic for the treatment of hyperkalemia

To the editor,

Hyperkalemia is a reversible cause of cardiac arrest and therefore part of the curriculum of European Resuscitation Council (ERC) Advanced Life Support (ALS) courses. However, many ALS course participants feel overwhelmed by the several treatment options in the guidelines and the course manual.¹ The three main goals in the treatment of hyperkalemia are: 1) Protecting the heart by stabilising the resting membrane potential of cardiomyocytes with calcium, 2) Shifting potassium from the extra- to the intracellular space with glucose/insulin, beta 2-agonists and sodium-bicarbonate (when renal failure is the presumed cause), and finally, 3) Removing potassium from the body through fluid balance, forced diuresis and/or dialysis.²

In ERC ALS courses, there is only little time to train participants in the correct and swift management of hyperkalemia, and especially prehospital personnel often struggle with this part since they usually have fewer points of contact with this topic. However, a *meta-analysis* found a prevalence of hyperkalemia in unselected adult patients of 6.3%.³ Severe hyperkalemia – especially when already causing arrhythmia – is a time-critical condition for which treatment should be started immediately.⁴ For such situations, aviation works with so-called “memory items”, which pilots must know by heart. The equivalent to those items in emergency medicine are mnemonics like the ABCDE or the H & T’s.⁵ Thus, we created a catchy and easy-to-remember phrase that covers the main treatment strategies for hyperkalemia:

PROTECT the heart with calcium!

PUSH potassium back into the cells (glucose/insulin, beta 2-agonists, bicarbonate)!

PISS Enable the removal of potassium from the body (crystalloids ± diuretics, consider dialysis)!

We further suggest the following translated versions:

- Dutch: **BESCHERMEN – BEWEGEN – PLASSEN**
- Danish: **BESKYTTE – FLYTTE – FJERNE**
- German/Luxembourgish: **SCHÜTZEN – SHIFTEN – SCHIFFEN**
- French: **PROTEGER – POUSSER – PISSER**
- Italian: **PROTEGGERE – PASSARE – PISCIARE**
- Spanish: **PROTEGER – PASAR – PIS**

We have already used this mnemonic multiple times in ERC ALS courses, and – supported by positive feedback – we are under the

impression that PROTECT – PUSH – PISS! supports the participants. Additionally, and maybe most importantly for long-term memory, it always brings a smile to their faces.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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