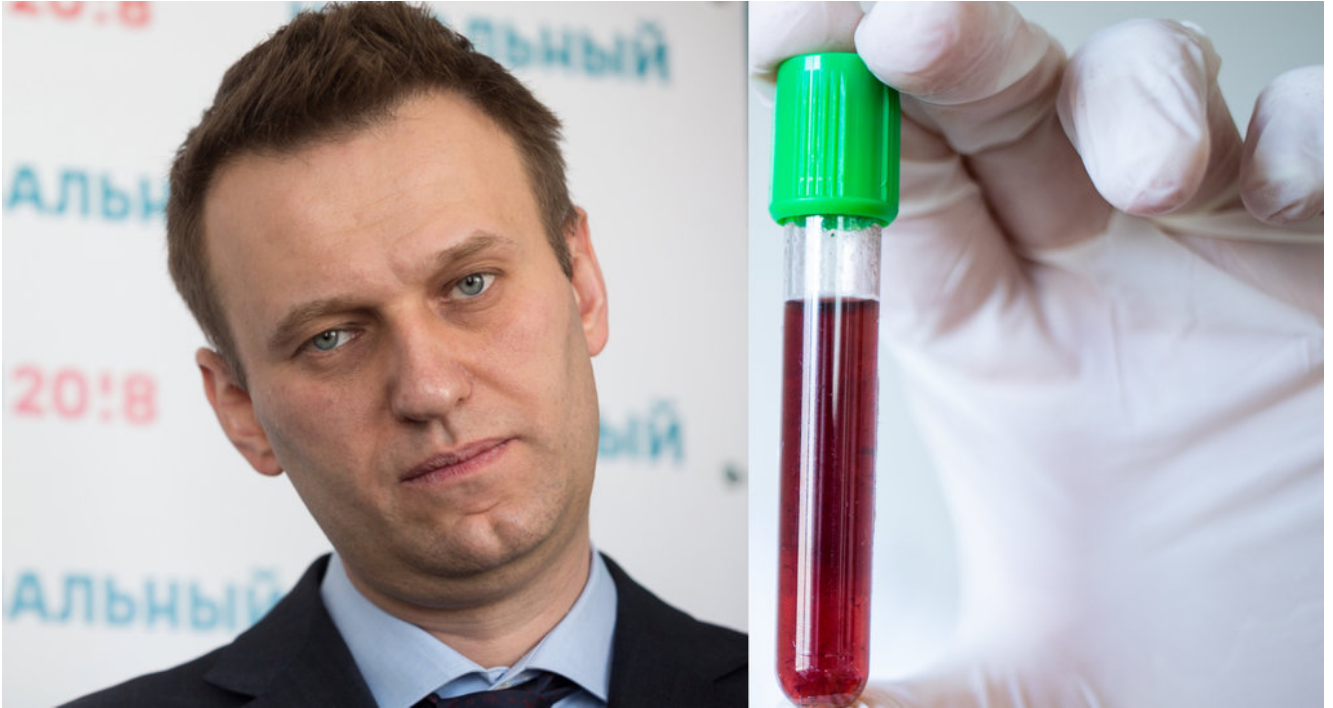


Comment to the publication of Steindl and colleagues in Lancet



Dr. sc. med. Vitalii V. Kozak, Neurologist

Steindl and colleagues described a case of intoxication, announced by the German Government as an intoxication with organophosphorus warfare nerve agent from the so called novichok group, basing on the classified data from a classified laboratory of the German armed forces.[\[1\]](#)

In the publication of Steindl and colleagues (further Publication), **the identity of the patient was disclosed as Mr. Alexei Navalny** (see Reference 1 in the Publication), a political videoblogger from Russia, which gives to this case a rather high political nuance.

I would like to provide some interesting comments on the

Publication and highlight some points, which, in my opinion, require explanation. First of all I have to disclose my conflicts of interests. I write these comments on the solicitation of the Editors of **World Economy Wirtschaft & Finanzen Newsreport** at no honorarium. As clinician and scientist I stay as equidistant as possible. However, my thoughts may seem not objective to some readers, and perhaps they are not, as I surely do have my own political position. In the end, as I mentioned above, this case is already toxically politicized, and the Publication – in my own opinion – is not cristal clean of politics. Further, I write this short piece without affiliation, stressing that this is a personal opinion. Lastly, the thoughts below were submitted to the Lancet in a slightly shortened form as unsolicited comment to the Publication, but received an editorial rejection.

1. A drug screening performed on admission **showed lithium in blood of the patient.**[\[2\]](#) Lithium is used for the treatment of psychiatric disorders, e.g. bipolar disorder or schizophrenia, and a certain toxicity burden is associated with lithium.[\[3\]](#) Firstly, it is worth mentioning the potential role of lithium in the cholinesterase inhibition. There is evidence that lithium inhibits cholinesterase activity in blood.[\[4\]](#) Thakar et al reported that the pseudocholinesterase activity of 54 patients with bipolar disorders (50% treated with lithium) was significantly lower than in 28 psychiatrically well subjects.[\[5\]](#) I think that this particular feature of lithium should be ethiopathologically considered, regardless within an

assumed intoxication with warfare nerve agent or without.

2. Secondly, there were reported some toxic effects of lithium itself, e.g. vomiting, bradycardia, myoklonus[6].

These toxic effects were described in the Publication.

Unfortunately, in the Publication there were provided no quantitative data on the performed drug screening, to conclude on toxicity.

3. Further, it would be of particular interest to find out the decontamination measures carried out in the described case. According to the summary of the report of the Organization for the Prohibition of Chemical Weapons (cited in the Publication) «the biomarkers of the cholinesterase inhibitor» with chemical structure similar to nerve agents from the novichok group were identified in blood and urine sampled from the patient on the 18th day (September 6nd, 2020) after symptom onset (August 20th, 2020), hence the nerve agent was present in the organism of the patient on the day of sampling. Exposition to chemical warfare nerve agents requires an urgent and extensive decontamination, including local skin decontamination, hospital decontamination and personnel decontamination.[7] In the publication of Vale and colleagues it was reported that there were sites of environmental persistence of the novichok nerve agent requiring specialist decontamination lasting several months[8]. In the same publication 46 members of the public had also gone to hospital expressing concern and 131 people had been identified who could potentially have come into contact with the nerve agent. Indeed chemical

warfare agents are extremely potent[9]. Medical Management Guidelines of the U.S. Department of Health and Human Services directly indicates to avoid any unprotected contact with potentially contaminated with chemical nerve agent people[10]. Unfortunately no information on the assumed toxin is provided in the Publication (obviously all such data declared as classified), to conclude on its biochemical properties, e. g. potential sources, metabolisation and toxicity of metabolites, the only reference to as «novichok agent» comes from the statement of the German Government.

4. Lastly, in the Publication it is mentioned that 31h after symptom onset the patient had «wide pupils non-reactive to light», which is contrary to cholinergic toxidrome, unfortunately the authors provided no explanation of this finding in their discussion. The wide pupils are hardly explained by an assumed complete nerve impuls transmission blockade or effects of the assumed therapy with atropine, because wide pupils were combined with bradycardia and hypothermia (obviously as a results of severe diaphoresis).

REFERENCES :

[1] Steindl D, Boehmerle W, Körner R, et al. Novichok nerve agent poisoning. *Lancet*. 2020; (published online Dec 22.) [https://doi.org/10.1016/S0140-6736\(20\)32644-1](https://doi.org/10.1016/S0140-6736(20)32644-1)

[2] Steindl et al., appendix page 2, unfortunately no quantitative data provided

[3] Gitlin M. Lithium side effects and toxicity: prevalence and management strategies. *Int J Bipolar Disord*. 2016;**4(1)**:27.<https://doi.org/10.1186/s40345-016-0068-y>

[4] Choi SJ, Derman RM. Lithium and cholinesterase. *Progress in Neuro-Psychopharmacology*. 1980;**4(1)**:107–109. [https://doi.org/10.1016/0364-7722\(80\)90067-3](https://doi.org/10.1016/0364-7722(80)90067-3)

[5] Thakar JH, Lapierre YD, Waters BG. Cholinesterases in primary affective disorders. *Clin Biochemistry*. 1985;18(5), 308–310.
[https://doi.org/10.1016/s0009-9120\(85\)80038-2](https://doi.org/10.1016/s0009-9120(85)80038-2)

[6] Offerman SR, Alsop JA, Lee J, Holmes JF. Hospitalized lithium overdose cases reported to the California Poison Control System. *Clin Toxicol (Phila)*. 2010;**48(5)**:443–448.
<https://doi.org/10.3109/15563650.2010.482533>

[7] Ganesan K, Raza SK, Vijayaraghavan R. Chemical warfare agents. *J Pharm Bioallied Sci*. 2010;**2(3)**:166–178.
<https://doi.org/10.4103/0975-7406.68498>

[8] Vale JA, Marrs TC, Maynard RL. Novichok: a murderous nerve agent attack in the UK. *Clin Toxicol*. 2018;**56**:1093–1097
<https://doi.org/10.1080/15563650.2018.1469759>

[9] Nepovimova E, Kuca K. Chemical warfare agent NOVICHOK - mini-review of available data. *Food and*

Chemical Toxicology. 2018; 121: 343-350.

<https://doi.org/10.1016/j.fct.2018.09.015>

[10] Fourth Generation Agents: Pre-hospital Medical Management Guidelines (Information as of January 18, 2019). Chemical Hazards Emergency Department. U.S. Department of Health and Human Sciences.

<https://chemm.nlm.nih.gov/nerveagents/FGAMMGPrehospital.htm>

Bilder @depositphotos

Die Meinung des Autors/Ansprechpartners kann von der Meinung der Redaktion abweichen. Grundgesetz Artikel 5 Absatz 1 und 3 (1) „Jeder hat das Recht, seine Meinung in Wort, Schrift und Bild frei zu äußern und zu verbreiten und sich aus allgemein zugänglichen Quellen ungehindert zu unterrichten. Die Pressefreiheit und die Freiheit der Berichterstattung durch Rundfunk und Film werden gewährleistet. Eine Zensur findet nicht statt.“