mg/dl) and normal glucose concentration and oligoclonal bands. Visual evoked potentials and a comprehensive screening for infectious and systemic autoimmune disorders were normal. Intravenous (i.v.) 1000 mg methylprednisolone treatment was administered for five days, and her dysphagia resolved in two weeks. In the following 14 years, she developed three transverse myelitis attacks. Aqp-4 Ab was detected in the archived sera obtained during the brainstem and myelitis attacks using a cell-based assay with Aqp-4-transfected HEK-293 cells (1).

Isolated dysphagia is a rare type of presentation for most neurological diseases. Dysphagia has been reported in a few NMO patients in association with other symptoms (4,5). Hiccups, nausea and vomiting presumably occur due to the involvement of the area postrema, located in the dorsal medulla. The solitary tract and dorsal vagal nuclei are located in close proximity to the area postrema. However, involvement of these nuclei alone apparently does not cause dysphagia (2). Dysphagia is expected to occur due to the involvement of the nucleus ambiguus, which is far more ventrally located and is thus spared in most cases. Our patient's findings show that medulla lesions due to NMO are not necessarily confined to the dorsal medulla and might extend ventrally, causing dysphagia. NMO should thus be suspected in patients presenting with dysphagia or other ventral medulla symptoms.

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# The prevalence of CYP2C19 mutations in Turkish patients with dyspepsia and influence on *H. pylori* eradication therapy

*Dispeptik Türk hastalarda CYP2C19 mutasyonlarının prevalansı ve bunun H. pylori eradikasyon tedavisine etkisi*

*To the Editor,*

We read with great interest the paper by Ozdil et al. published in your journal entitled "Influence of CYP2C19 functional polymorphism on Helicobacter pylori eradication" (1). In that paper, they reported that cytochrome P450 2C19 (CYP2C19) polymorphism has an impact on *H. pylori* eradication, and heterozygous CYP2C19 extensive metabolizers (hetero EMs) had statistically signifi-


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cantly better *H. pylori* eradication rates compared with homozygous extensive metabolizers (homo EMs).

CYP2C19 is an enzyme that functions in the metabolism of drugs such as clopidogrel, barbiturates and diazepam, as well as proton pump inhibitors (PPIs). Among these drugs, while PPIs, barbiturates and anxiolytics are metabolized to inactive metabolites, clopidogrel is metabolized to its active form by the same enzyme system. CYP2C19 genotypes are classified into three groups as rapid metabolizers with wild type genes on both alleles (homo EMs), intermediate metabolizers with a mutation on one allele (hetero EMs) and poor metabolizers with mutations on both alleles (PMs). Taking into account our study and other studies from our country on the CYP2C19 polymorphism, it is seen that 75-84% of our population are homo EMs. In these studies, the rate of PMs is 1-5%. While these results are close to the results of the Caucasian race, they are quite different from Asian results, in which the rate of PMs is about 20% (2).

Intragastric pH generated by PPIs is higher in PMs compared with homo or hetero EMs. As it is known that high intragastric pH enhances the efficacy of antibiotics, high intragastric pH is important in the eradication therapy (3). One meta-analysis showed that CYP2C19 polymorphism affects eradication rates only in omeprazole-based therapies and has no significant effect in lansoprazole- and rabeprazole-based therapies (4). In another meta-analysis, it was shown that CYP2C19 polymorphism affects mostly omeprazole, followed by pantoprazole and lansoprazole, while rabeprazole is the least affected. Another important finding of this study is that twice-daily double dose of PPI results in a 0.5 point higher pH compared with twice-daily single dose of PPIs (5). It is thought that rabeprazole is less affected by the CYP2C19 polymorphism as it also has non-enzymatic metabolization. Therefore, rabeprazole-based triple therapies may provide an advantage in *H. pylori* eradication therapy of EMs.

In addition, besides dose increments of PPI in homo EMs, the second important feature that should be taken into consideration is that it takes about five days for PPIs to reach the fixed effect level. Our study, in which we evaluated the effects of four different PPIs (esomeprazole, lansoprazole, pantoprazole and rabeprazole) on intragastric pH levels, showed that mean intragastric pH levels and pH <4 time percentage achieved by the drugs were 10-20% higher on the fifth day compared with the first day (unpublished data).

When these results are considered, it seems logical to investigate the efficacy of *H. pylori* eradication protocols using double-dose PPIs instead of standard dose and starting PPIs at least five days prior to antibiotics in our population, in which 80% are homo EMs, and also to investigate whether these protocols increase the eradication rates.

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