Krajowa Konferencja Zastosowań Matematyki w Biologii i Medycynie

Sandomierz, 5th–9th September 2016

WHAT DO WE KNOW AND WHAT WOULD WE LIKE TO KNOW? THE ROLE OF MATHEMATICS IN NEUROLOGICAL SCIENCES — SELECTED ISSUES

Piotr Sobolewski

Department of Neurology and Stroke Unit
of Holy Spirit Specialist Hospital in Sandomierz
ul. Schinzla 13, 27-600 Sandomierz
piotrsobolewski@poczta.onet.pl

ABSTRACT

Neurology is a rapidly developing field of medicine. Many issues have been sufficiently studied, but we still have to deal with unsettled questions. Modern diagnosis and treatment of diseases of the nervous system requires the use of the latest, sometimes very advanced technology and highly specialized medical apparatus. Usually, the physician evaluating the diagnostic test or performing a specific medical procedure does not study the scientific basis of the method used in clinical practice. The doctor expects the fastest and the simplest form result of the test.

In the first part of the presentation, the principles on which the "Evidence-based medicine" (EBM) is based and the role of medical statistics in the evaluation of data in clinical trials were reminded. A brief critical analysis of the interpretation of the results of clinical trials were performed and the role of multicenter registries used in clinical practice of medical procedures was highlighted [1]. In the next part, the practical application of selected diagnostic and therapeutic procedures including the treatment of patients with ischemic stroke [2]–[4], hydrocephalus [5], the reconstruction of the skull and facial bones [6], and the diagnosis of patients with multiple sclerosis [7] was presented.

REFERENCES

[1] P. Gajewski, R. Jaeschke, and J. Brożka: *Podstawy EBM*, Medycyna Praktyczna (2008).

[2] Elgendy I.Y., Kumbhani D.J., Mahmoud A., Bhatt D.L., and Bavry A.A.: *Mechanical thrombectomy for acute ischemic stroke: A meta-analysis of randomized trials*, J. Am. Coll. Cardiol. **66(22)** (2015), 2498–505.

[3] Sobolewski P.: *Przegląd inwazyjnych wewnątrznaczyniowych metod leczenia chorych w ostrym okresie udaru niedokrwiennego mózgu*, Udar Mózgu. Problemy Interdyscyplinarne **13,1-2** (2011), 5–11.

[4] Solberg Y., Ariav G., Altman H., and Dayan A.: *Spg stimulation for enhancing neurogenesis and brain metabolism*, U.S. Patent Application **No. 12/197,614**.

[5] Greitz D.: *Radiological assessment of hydrocephalus: new theories and implication for therapy*, Neurosurg. Rev. **27(3)** (2004), 145–165.

[6] Karbowski K., Moskała M., Polak J., Sujka W., and Urbanik A.: *Zastosowanie tomografii komputerowej do opracowania protezy CODUBIX na indywidualne zamówienie pacjenta*, Acta Clinica et Morphologica **15(2)** (2012), 10–16.

[7] Jacobsen C.O. and Farbu E.: *MRI evaluation of grey matter atrophy and disease course in multiple sclerosis: an overview of current knowledge*, Acta Neurol. Scand. **129 (Suppl. 198)** (2014), 32–36.