ABSTRACT

The aim of the study was an attempt to answer the question: Does hemorrhagic fever with renal syndrome (HFRS) occur in humans in Poland? The HFRS research began in 2004 when the first index confirmed case (a woman from the Province of Subcarpathian) was diagnosed. Study presents data from 15-years research confirming the endemic, established and indigenous occurrence of hantavirus infections in Poland. Since 2007, these studies have allowed the implementation of identifying the disease in the country, with the current, routine virological diagnostics and the statutory obligation of report and register. In addition, retrospective studies showed that human hantavirus infections were also found in earlier years. The study implemented a method of double verification of serological results as a method for determining the etiology of HFRS. Medical interviews with patients were supplemented with a self-designed survey. These methods allowed it to detect a number of epidemiological parameters of HFRS (including environmental exposure), at the same time disseminating information about hemorrhagic fever with renal syndrome, the only native hemorrhagic fever occurring in Poland. In the years 2004 - 2018, a total of 1,370 diagnostic tests were carried out in 721 people whose symptoms suggested the possibility of contracting the disease. 164 cases of HFRS were diagnosed (22.7% of the patients). Serologically, hantavirus etiology was demonstrated in 93 cases of PUUV-HFRS (59%) and 71 cases of DOBV-HFRS (41%). Among hospitalised patients, 43% of patients in the DOBV-HFRS group had severe disease, 52% had moderate disease, 5% had mild disease, and among patients in the PUUV-HFRS group, 4% had severe disease, 66% had moderate disease and 30% with mild. 2.3% of all HFRS cases were fatal and these were patients diagnosed with DOBV-HFRS. Implementation of renal replacement therapy was necessary in 2.5% of PUUV-HFRS cases and up to 31% of DOBV-HFRS patients. In the clinical presentation, HFRS in Poland was a febrile disease, with acute thrombocytopenia and hemorrhagic diathesis, with acute kidney injury and multi-organ complications. DOBV etiology increased the severity of HFRS 18-fold (OR=18.05 (CI 5.05-64.57). Two cases of co-infection with *Leptospira interrogans* have been reported, resulting in a more severe course of PUUV-HFRS. The frequency of identification of HFRS caused by DOBV in the population in Poland is higher than that recorded in Northern and Western Europe (there are approx. 3% as DOBV-HFRS). Among occupational groups exposed to hantavirus infections, seroconversion of anti-

hantavirus antibodies was found at the level of 3.18% at foresters in the Lublin Region (IgG anti-DOBV and IgG anti-PUUV antibodies were detected) and 2.4% at foresters in the Province of Subcarpathian (IgG anti-PUUV antibodies were present). An epidemic increase in the incidence of HFRS in humans had occurred in Poland in 2007, 2014 and 2021 (with 7-year intervals).

HFRS was diagnosed in 8 voivodeships of Poland: Eastern, South-Eastern, Southern and Central. The endemic area with the highest incidence of HFRS in Poland is the Province of Subcarpathian and the area of hyperendemia in the Sanok poviat and the Komańcza commune of the same region. The average incidence of HFRS in Poland in 2007-2018 was 0.021 cases per 100,000 inhabitants (from 0.008 to 0.140 / 100,000), in the Province of Subcarpathian - the incidence of HFRS was 16 times higher. In the Sanok poviat of this province, the incidence was very high, reaching 30.26 cases per 100,000 inhabitants. In Poland, HFRS is an extremely "underestimated" disease and it is necessary to significantly improve detection of its cases, especially among people who are environmentally and professionally exposed to this dangerous zoonosis. This can be achieved through the introduction of active epidemiological or sentinel surveillance, the expansion of laboratory diagnostics and continuous educational activities, both among the population at risk and health care personnel.