

BACKGROUND

Central European Tick-borne encephalitis (TBE) is a viral disease of the central nervous system. Despite an existing surveillance system for TBE in Poland, no case-definitions previously were used to confirm TBE and different diagnostic tests were used in various regions. The purpose of this study was to summarize four years of surveillance data using a standardized case definition.

METHODS

Existing TBE reports from the years 1999-2002 were analyzed using a new case definition. A possible locally-acquired case was defined as a clinically compatible illness (fever with symptoms of aseptic meningitis or encephalitis), and onset of illness during TBE season. A probable case was defined as a compatible illness with either travel to an endemic area during the previous six weeks or detection of specific IgM antibodies in serum, with no history of vaccination against any Flavivirus. A confirmed case was defined as a compatible illness and either isolation of TBE, detection of specific IgM or IgG antibodies in cerebrospinal fluid, or fourfold or greater rise in serum antibody titer.

RESULTS

From 1999 to 2002, 607 cases of TBE were reported to Poland's national surveillance system: 386 (63.6%) were males, 331 (54.5%) lived in rural areas, and 186 (30.6%) were 30 to 50 years of age. Of the 607 reported cases 602 (99.2%) could be classified as cases: 106 (17.6%) as possible cases, 343 (57.0%) as probable cases and 153 (25.4%) as confirmed cases. Comparisons between case definition groups showed a significant difference for gender (chi-square =10.48, p=0.0053). 28.6% of male cases were classified as confirmed cases, compared with 19.7% of female cases. There were also significant differences in the distribution of cases by case definition group across geographical regions.

CONCLUSIONS

TBE is an emerging disease spreading from Central to Western and Northern Europe, potentially related to climatic changes. For appropriate monitoring of disease status, a uniform and valid case definition should be used in European countries. With only 25% of reported cases meeting the definition for confirmed cases, there is a need for more complete follow-up and standardized testing of suspect cases.

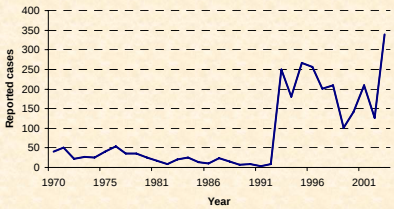
Case ascertainment of tick-borne encephalitis in Poland

Pawel Stefanoff,¹ Andrzej Zielinski,¹ Millicent Eidson,² Dale L Morse²
1) National Institute of Hygiene, Department of Epidemiology, Warsaw, POLAND
2) New York State Department of Health, Albany, NY.

BACKGROUND

- Tick-borne encephalitis (TBE) has been endemic in Poland for several years.
- TBE is endemic in neighboring countries and is spreading to regions of Northern and Western Europe, where it was not seen before.
- The disease can lead to disability or death, and despite existing vaccination programs is an increasing problem.
- The number of reported cases has varied since 1993 with 100 to 350 cases per year (Figure 1).

Figure 1. Reported cases of tick-borne encephalitis in Poland, 1970-2001



(data based on: National Institute of Hygiene, Department of Epidemiology, Infectious Diseases And Poisonings in Poland; brochures for years 1970-2002)

- In 2003 new case-definitions of TBE were established by an expert panel for the surveillance system in Poland.
- The aim of this study was to analyze cases reported in Poland from 1999-2002 to compare differences by category of case definition.
- Detected differences could help appropriately target interventions to improve the reporting and diagnostic quality.

METHODS

Existing TBE reports from the years 1999-2002 were analyzed using a new case definition (Table 1):

Table 1. Tick-borne encephalitis case definitions, Poland, 2003

Possible case	a. clinically compatible disease (febrile illness with diverse neurological symptoms of aseptic meningitis or encephalitis), AND b. onset of illness during a period of increased tick activity (between April and November).
Probable case	Possible case AND a. ill person visited an endemic area during previous 6 weeks, OR b. detection of specific IgM antibodies in serum, with no history of vaccination against any flaviviral disease during previous 3 months
Confirmed case	Possible case AND a. detection of specific IgM or IgG antibodies in cerebrospinal fluid, OR b. fourfold or greater rise in serum antibody titer, with no history of vaccination against any flaviviral disease during previous 3 months, OR c. viral isolation from tissue, blood, or cerebrospinal fluid.

Cases were compared using the new case definition groups by year, season of onset, gender, age group, residential area type, occupation, clinical course and geographic location.

Statistical analysis:

- All variables were categorized.
- Cases were compared using case definition groups with the chi-square test.
- A logistic model was used to detect factors predicting the probability of being classified as a confirmed case

RESULTS

Of the 607 reported cases 602 (99.2%) were classified as possible, probable or confirmed.

Table 2. Tick-borne encephalitis case classification, Poland, 1999-2002

Possible cases	106	17.6%
a. Clinically compatible	106	100.0%
b. Onset during tick activity season	106	100.0%
Probable cases	343	57.0%
a. Visit in endemic area*	NA	-
b. Specific IgM in serum	343	100.0%
Confirmed cases	153	25.4%
a. Specific IgM or IgG in CSF	142	92.8%
b. 4-fold rise in antibody Ig titer	17	11.1%
c. viral isolation from tissue**	0	0.0%

* Data not reported in the forms
** Test not performed in 1999-2002

Figure 2. Tick-borne encephalitis case classification by year, Poland, 1999-2002

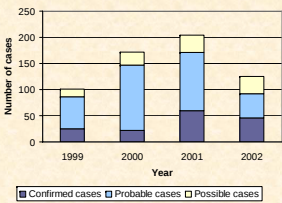


Figure 3. Tick-borne encephalitis case classification by season, Poland, 1999-2002

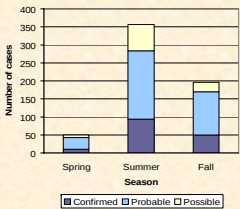
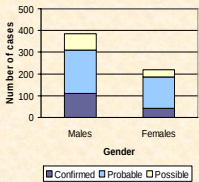
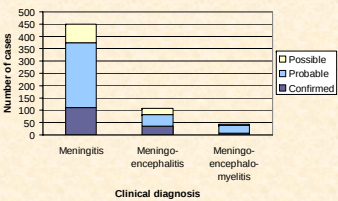


Figure 4. TBE case classification by gender, Poland, 1999-2002.



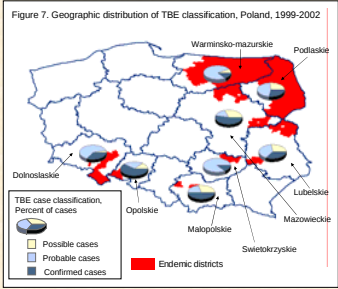
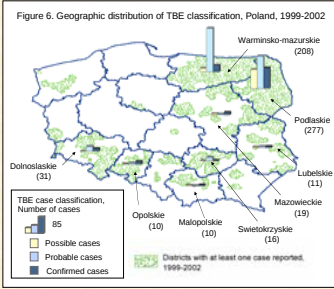
There was a significant difference in case classification by gender ($\chi^2=10.48$, $p=0.0053$). 28.6% of male cases were classified as confirmed cases, compared with 19.7% of female cases.

Figure 5. TBE case classification by clinical diagnosis, Poland, 1999-2002.



There was a significant difference in case classification by clinical diagnosis ($\chi^2=11.79$, $df=4$, $p=0.019$). Overall, 32.4% of cases with meningo-encephalitis were classified as confirmed case, compared with 24.7% of cases with aseptic meningitis.

No significant differences were established between the number of cases by case classification group for other clinical and demographic factors, such as: year of onset, season of onset, age, occupation, type of residential area (urban/rural).



Geographic comparisons were performed only for provinces where more than 10 cases were reported during the period 1999-2002.

The comparison of number of cases by case classification group for voivodeships showed highly significant differences ($\chi^2=94.36$, $df=8$, $p<0.0001$) between regional case classification.

The probability of being classified as confirmed case was modeled.

- Controlling for geographic location, males were more likely to be classified as confirmed cases, compared to females (OR=1.92, 95% CI: 1.21 – 3.11, $p=0.0069$).
- Controlling for demographic factors, living in Warminsko-mazurskie voivodeship was related with not being classified as a confirmed case, compared with living in other voivodeships (OR=3.99, 95% CI: 1.65 – 10.76, $p=0.0034$).
- Controlling for demographic factors, living in Podlaskie voivodeship was related with not being classified as confirmed case, compared with living in other voivodeships (OR=1.68, 95% CI: 1.04 – 2.69, $p=0.0319$).

Geographical differences in case classification are linked with differences in diagnostic tests used to confirm TBE:

- The serum IgM test is used extensively in Warminsko-mazurskie (81.3% of cases were classified as probable) and in Podlaskie (45.1% of cases were classified as probable).
- IgM and IgG tests of cerebro-spinal fluid were used in Opolskie (58.8% of cases were classified as confirmed), Mazowieckie (52.6% of cases were classified as confirmed) and Malopolskie (50.0% of cases were classified as confirmed).

CONCLUSIONS

- Tick-borne encephalitis (TBE) is endemic in the northeast of Poland with approximately 200 cases a year reported countrywide.
- Only 25% of cases reported in 1999-2002 had sufficient diagnostic tests to meet the definition for a confirmed TBE case.
- Some endemic northeastern regions of Poland, particularly Warminsko-mazurskie voivodeship, were less likely to perform confirmatory diagnostic testing of the cerebrospinal fluid and were more likely to rely on serologic results.
- The case report form needs to be modified to collect missing information, such as residing or visiting an endemic area. The usefulness of collecting this data should further be assessed to determine its benefit in classifying cases.
- Viral isolation test was never used to confirm TBE diagnosis in the 4-year period. There is a need to consider the usefulness of this test in the TBE diagnostic protocol in the future.
- The implementation of the new case definition needs to be linked to enhanced education about the appropriate diagnosis of the disease and need for standard, uniform diagnostic protocols.