CONCERNING THE SEASON-FACTOR IN PERTUSSIS

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The problem of seasonal factors in whooping cough needs further elucidation. Tanev and Shterev (10) establish a larger widespreadness of the affections during the warm months of the year, owing to the increased contact between children. Bratovanov, Targov and Yankov (1) point out that the seasonal factor in whooping cough is rejected as a contributing cause by Samet and Londar (cited by Guslitz — 4).

Gromashevski (3) attaches importance to coughing and unorganized, outdoor familial contacts (intercourse) between children during the warm seasons of the year. Guslitz (4) assumes that the seasonal pertussis curves are similar in different countries, regardless of geographic and climate conditions.

The discordant opinions motivated the authors to undertake an investigation on the problem of the seasonal factor in whooping cough and the probable contributory cause.

Method and material

The seasonal pertussis morbidity rate is established on a nation-wide scale and separately for the European-Continental and Continental-Mediterranean climatic regions as well as according to sex, organized and not organized children, aged up to 6 years; the city of Varna is included in the study, covering the period 1960—1964.

The morbidity rate is determined on the basis of data furnished by recording journals of infectious diseases, standard form № 60, Epidemiological Institute — Varna. The remaining data are obtained from the statistical department — District People's Council, Hydro-meteorological Service — Varna and Central Statistical Direction.

One hundred epidemiologic investigations are carried out on pertussis patients, aiming anamnestic detection of catarrhal phenomena involving the upper airways during the incubation period i. e. up to ten days after their probable contact with subjects affected with whooping cough.

A comparative study is made of the curves of the average number sunny days per month and the seasonal aspects of whooping cough for the city of Varna, for the period 1960—1964.
Discussion

It is obvious from diagram 1 that the seasonal curves on a nationwide scale and for the city of Varna in particular, covering the period 1960—1964, show a sharp rise beginning from May, reach a peak in July with a steep fall beginning from September. The lowest morbidity is recorded during the period September — April, i.e. during the 8 cooler months of the year, for the period studied, less than one half of the total number of affec-
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Fig. 2. The seasonal factors of whooping cough among organised and unorganized children up to 6 years of age in the city of Varna for the period 1960—1964, in percentiles.

- - - - organized children up to 6 years of age
- - - - unorganized children up to 6 years of age
- - - - school-children

The data obtained for the city of Varna are similar — 647, resp. 927. Comparing the seasonal curves of the two climatic regions in the country, it has been established that in addition to the characteristic maximum upsurge during July, a minor one is also noted during February for the Continental-Mediterranean region (+). The seasonal sex curves are almost parallel.
Diagram II demonstrates that the seasonal curves among organized and not organized children, aged up to 6 years inclusive, differ in their ascending arms, with the curve of the latter showing an earlier rise; both seasonal curves are with equal modal values and virtually coincident descending arms. The school-age seasonal curve, that is children aged 7—17 years, is increased sooner, reaching its maximal value in June.

How could all these facts be explained? In attempting elucidation of the seasonal aspects of whooping cough, it is imperative to proceed from the characteristic biology of the pertussis bacterium. It is an aerobe (7, 10), biochemically “inactive” (7, 10), grows slowly on nutrient media [in 2—
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4 days (10), in 3—4 days (2, 5, 7), in 2—5 days (8) only provided antibiotics are added for preventing the inhibitory action of the surrounding microflora (mainly bacteria, as the vira, being intracellular parasites, could hardly be reproduced in the nutrient media employed). In addition, whooping cough bacteria are propagated on the superficial mucosa of the respiratory tract (9, 10). The latter finding warrants the assumption that whooping cough bacteria could hardly compete the activated conditioned pathogenic or pathogenic bacterial microflora along the mucosa of the respiratory tract, even in instances of viral etiology of the upper airways' affections, on account of the circumstance that the viral infectious process is invariably accompanied by catarrhal phenomena of the respiratory tract, brought about by the supplementary action of the conditioned pathogenic bacterial flora. The biologic antagonism pointed out, is in all likelihood, the cause contributing for the widespread of the whooping cough disease mainly during the warm months of the year, when the mucosa of the respiratory tract is in a state of physiological balance.

The comparative study of the seasonal dynamics of upper airways' acute catarrhs and whooping cough (see diagr. 3) readily outlines their inverse dependence. This practically mirror pattern of the two seasonal curves confirms the role played by the antagonism between the pertussis bacteria and the microflora, responsible for the acute catarrhs of the upper respiratory tract.

Against the background of 100 epidemiologic investigations, performed on patients with whooping cough, it was established, from the past history, that in 78 of the total, catarrhal phenomena within the upper airways were absent for a period ranging from 8 to 10 days after the supposed contact with the contagion source, i.e. they were in the incubation period. Owing to the fact that the mucosa of the infected with pertussis bacteria was in a state of physiological balance and the biologic antagonism could not be manifested, the contaminated were affected.

Of particular interest for the seasonal factor is likewise the pathogenesis of the disease, respectively of the coughing, as the latter provides for the propagation of the pertussis bacteria at a greater distance, thereby contributing for the possibility of contamination, occurring in the open air, during summertime children games.

The phase during which the stimuli remain within the surrounding medium is furthermore favoured by the water evaporation from the bacteria in higher temperatures of the air and by the production of "nucleoli", likewise remaining for longer time in the air (10). All this leads to the activation of the mechanism of transmission of the contamination in outdoor conditions, especially during the comparatively warm months of the spring; the acute intensification of sun radiation during the summer creates unfavourable conditions for the accomplishment of the phase during which the stimuli remain in the external environment (see diagram 3).

Immunization likewise exerts influence upon the seasonal factor. The latter is adequately manifested with a modal value during July concerning the period 1956—1959 for the city of Varna. However, following the mass application of anti-pertussis immunization (for the period 1960—1964), a comparatively more uniform distribution of the affection was established except for the strongly pronounced seasonal upsurge in 1962, which was
the result of a cyclic manifestation. The cause for its occurrence should be sought for in the untimely and incomplete immune treatment of all individuals liable to immunization (see table 1) and possibly, in the low effectiveness of the anti-whooping cough vaccine.

Table 1 illustrates the subjects liable to immunization against whooping cough and immunized quarterly in Varna, covering the period 1963—1964

<table>
<thead>
<tr>
<th>Year</th>
<th>Quarters</th>
<th>Liable to Immunization</th>
<th>Subjected to Immunization</th>
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</thead>
<tbody>
<tr>
<td>1962</td>
<td>I</td>
<td>513</td>
<td>165</td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>519</td>
<td>603</td>
</tr>
<tr>
<td></td>
<td>III</td>
<td>524</td>
<td>745</td>
</tr>
<tr>
<td></td>
<td>IV</td>
<td>552</td>
<td>599</td>
</tr>
<tr>
<td>1963</td>
<td>I</td>
<td>493</td>
<td>206</td>
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<td></td>
<td>II</td>
<td>493</td>
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<td></td>
<td>III</td>
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<td>896</td>
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<td></td>
<td>IV</td>
<td>552</td>
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<tr>
<td>1964</td>
<td>I</td>
<td>604</td>
<td>250</td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>555</td>
<td>828</td>
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</tbody>
</table>

Inferences

The seasonal factor in whooping cough might be explained with the characteristic biology of the morbid condition stimulus, its pathogenesis, natural-climatic aspect and concomitant acute catarrhs of the upper respiratory tract, dependent on the intercourse activity of the children and the extent of their immune protection.

REFERENCES

1. Братованов, Д., Ж. Таргов, К. Яков. Ръководство за практическа работа по епидемиология. Хр. Г. Дянов. Пловдив, 1965, 109—111.

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(+) The Continental — Mediterranean climatic region is characterized by comparatively warm autumns and cooler springs.
О СЕЗОННОСТИ ПРИ КОКЛЮШЕ

К. Кузмов и П. Кокошаров

РЕЗЮМЕ

Изучена сезонность за период 1960—1964 г. Установлено наличие летней сезонности с модой сезонной кривой в июле месяце. На месяцы V—VIII приходится более половины заболеваний изученного периода.

Сезонность объясняется биологическими особенностями коклюшной бактерии, патогенезом заболевания, повышенной активностью общения детей и степенью солнечной радиации.


Цикличность в периоде 1960—1964 г. сохраняется и она обусловливает моду суммарной сезонной кривой в м. VII для рассматриваемого периода.