

ETIOLOGICAL CHARACTERISTICS OF ADENOVIRAL INFECTIONS IN THE DISTRICT OF VARNA, COVERING THE PERIOD 1969—1971

G. Kaprielian

The problems related to the etiology of acute respiratory diseases are very important and pressing. A particular role in the etiology of these affections, in addition to the grippé virus, has been attributed to adenovira, paragrippe vira, RS and other vira (1, 2, 3, 5, 9, 12, 13). Diseases conditioned by adenoviral etiology are met with all year round, with children in early and pre-school age being mostly susceptible to affection (4, 8, 10, 11). The adenovira cause respiratory way infections, characterized by a great variety of clinical findings (6, 7).

In the present work, the results are reported of virological and serological studies on adenoviral infections, carried out in the district of Varna over the period 1969 through 1971.

Material and Methods

A total of 1214 patients, hospitalized at the children's and internal diseases' clinic of the Higher Medical Institute — Varna, were subjected to investigation. Various age groups with clinical diagnosis grippé, bronchopneumonia, rhinopharyngitis, tonsillitis and other respiratory affections were included in the survey. Nasal throat washings, fecal samples and blood prelevated at the onset of the affection and two weeks thereafter, were used for virological and serological studies. For virus cultivation and isolation, 10—12 days old hen embryos, monolayer trypsinized cellular cultures HEK (human embryo kidney), HEF (human embryo fibroblasts), hen embryo fibroblasts and some strain lines Hela, FL and Detr. 6 were employed. The contaminated cellular cultures were checked daily for the occurrence of characteristic cytopathogenic effect (CPE). Parallel recordings were also made of the hemagglutination and hemadsorption reactions. Hemalum-eosin stained preparations were used for morphological investigation purposes. Isolated vira typing was carried out through the virus neutralization test (VNT) and hemagglutination inhibition test (HIT). Immune sera were employed, obtained after injecting rabbits with adenovira, serotypes 1—7 in titers 10^{-3} , 10^{-6} CPD₅₀.

Investigations were conducted on 540 double and 674 single sera, taken from patients with acute respiratory diseases. The serological studies were based on complement fixation (CF) and HIT. CF was carried out in cold after the method of Mayer, while HIT — after the micromethod pro-

posed by Takachi. Adenoviral antigens, serotypes 1 through 7 were used. Parallel complement fixation (CF) was performed with RS antigen, available by the courtesy of the Hygiene-Epidemiologic Institute — Plovdiv (Dr. Mandulov), while HIT — with grippe antigens, obtained from the grippe center (Dr. Nikolova) and in our own laboratory.

The double sera in which a two- and four-fold increase of the antibodies was established in the secondary sera, were accepted for positive. In the single sera, those with complement fixation antibodies at titers 1:20—1:80 were considered as positive.

Results and Discussion

As a result of virological studies performed on a series of 640 cases with acute respiratory diseases (ARD), 35 grippe vira, type A₂, were isolated on hen embryo (mainly during 1969), whereas of the 220 nasal throat washings and fecal samples on cellular cultures investigated, 72 cytopathogenic agents were isolated. Of the latter, 14 were identified as hemadsorptional and hemagglutination vira, and 31 cytopathogenic agents on the basis of the VNT were classified as adenovira, serotypes 3, 7 as well as in the group of latent adenovira, serotypes 4, 5 and 6. Worth noting is the high percentage of adenovira isolated during the grippe interepidemic period (14,3%). The cellular cultures HEK and Hela were the most sensible to the vira isolated. Cytopathogenic effect (CPE) occurred within the first few days after the contamination of the cells and was manifested by typical degeneration, characteristic localization and intranuclear changes of the cells.

As evident from Fig. 1, out of 230 double sera investigated during 1969, 144 — during 1970 and 166 — during 1971, positive results for adenoviral infections were established accordingly in 28.7, 27.1 and 41.5 per cent. The high percentage of positive sera in 1971 is attributed to the circumstance that two sporadic foci of acute respiratory affections among children were investigated, mainly with adeno- and RS viral etiology. In the course of studies on 674 single sera, similarly obtained from patients with affection of the upper respiratory ways, CF-antibodies in titers 1:20—1:80 were established in 10.9 to 12.6 per cent.

In 1969, the year of the grippe epidemy outbreak in the district, caused by the grippe virus, type A₂HK 1/68, affecting from 50 to 71.4% of the investigated (11), ARD with adenoviral etiology in the various age groups amounted to 16—32.7 per cent. In 1971, 38.4% of the children investigated, aged from 2 months to 3 years, 46.4% of those aged 4—15 years, 53.1% — aged 16—30 years and 52% of those older than 30 years were with adenoviral etiology. The high incidence of adenoviral infections in practically all age groups of the district population was most impressive. It was established that 17.6—38.4% of the children investigated, aged from 0 to 3 years, and 16.0—50.0% of those aged 4—15 years have been affected by adenoviral infections over the period 1969/1971.

The study of ARD in the district by seasons and months revealed a high percentage of adenoviral infections during the first, second and fourth annual quarters. Thus, 19.7% of the 132 sera investigated during the I quarter, 16% of the 50 double sera investigated during the II quarter and

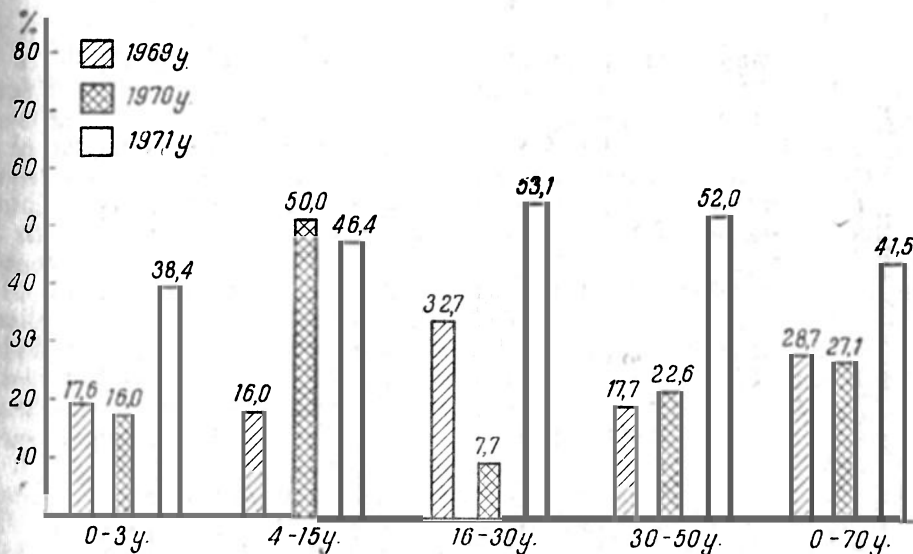


Fig. 1

23% of 48 double sera investigated during the IV quarter of 1969 were positive for adenoviral infections. The identical indices were much higher in 1971, when the affections of the upper respiratory ways disclosed an increase of incidence (31.7%, 40.2% and only for October 55.5% of the total number of double sera investigated). Table 1 illustrates the results of investigations on cases affected with various clinical diagnoses. Attention is called to the fact that 15.5% of the cases with clinical diagnosis bronchopneumonia, investigated in 1969, 21.0% — in 1970 and 35.5% — in 1971 had adenoviral etiology. The percentage of adenoviral etiology was likewise high among the patients examined with clinical diagnosis rhinopharyngitis, tonsillitis, grippe and other respiratory affections. Table 2 shows the results of studies on the incidence of adenoviral infections, caused by different serotype adenovira. As obvious from the data submitted, 30.1% of the double sera investigated in 1971 produced positive reaction with adenovirus type 4, 8.9% — with adenovirus type 5, 4.8% — with adenovirus type 6 and 13.3% — with adenovirus type 7. In 1971, the most frequently occurring etiological agents in respiratory viral infection among the children, aged 2 months to 3 years and 4—15 years, were adenovira types 3 and 7. During the period reviewed, mixed adenoviral and grippe infections were established in 3.1—5.2% of the investigated, and adenovira+ +RS infections — in 4.3—12.1% of the double sera investigated. The

results obtained differ insignificantly from the data reported by Bulgarian, Soviet and other foreign authors concerning Bulgaria, neighbouring and other countries (2, 4, 6, 8).

Inferences

1. The comprehensive virological and serological studies of adenoviral infections in the district of Varna, covering the period 1969—1971, have enabled the author to make a more detailed interpretation, as well as to outline the characteristic features of ARD etiology. Out of 664 nasal-throat washings investigated, 35 strains of grippe vira, type A₂, were isolated, whilst out of 220 specimens contaminated over cellular cultures, 31 strains of adenovira, types 3 and 7, were isolated, as well as «latent adenovira», serotypes 4, 5 and 6.

2. In the course of serological investigations on 540 double sera, obtained from children and adults affected with ARD, adenoviral etiology was established in 27.1—41.5% of the examined. A rather high incidence was established in all age groups. Mixed adenoviral and grippe infections constituted 3.1—5.2%, while adenoviral+RS infections — 4.3 to 12.1% of the cases investigated.

3. In an attempt to establish the proportion of adenoviral infections, caused by various serotype vira, it has been found out that in 1970 and 1971, adenovira, type 3 and 7, were the most frequent etiological agents of ARD among children in infancy, preschool and school-age (19.7% and 13.3% respectively).

4. During the period surveyed, 15.5—35.5% of the cases with diagnosis bronchopneumonia investigated, 19.0—31.8% with diagnosis rhinopharyngitis and tracheobronchitis, 12.5—27.3% with diagnosis grippe and from 38.0 to 50.0% of the cases with diagnosis tonsillitis were with adenoviral etiology.

REFERENCES

1. Дрейзин, Р. С., Е. Златарская, А. А. Давыдова. *Вопр. вирусологии*, 1962, 1, 85
2. Зубко, Л. А., Н. В. Думкина, К. О. Леонидова и др. Кн. Грипп и ОРЗ, Матер. сессии, Л. I, 1967, 88—90.
3. Носова, С. Д., В. Д. Соболевой. *Респират. вир. и энтеровир. инфек. у детей*, М., 1965, 97—137.
4. Херсонская, Я. Р. Кн. Клиника и лечение аденовирусных заболеваний, К., 1971.
5. Ритова, В. В. Кн. Острые респ. вирусные инфекции у детей раннего возраста, М., 1969.
6. Шиндеров, Л., С. Тодоров, Е. Тонев, В. Арнаудова, Г. Митов, Н. Нинов, Д. Монеv, *Съвр. медицина*, 1961, 12, 3—8.
7. Мандулов, В. *Бюл. НИЕМ*, 1963, 3, 51—55.
8. Добрев, И. *Бюл. НИЕМ*, 1966, 5, 143—148.
9. Рангелова, Ст., И. Добрев, Е. Цилка, С. Н. Гюрова, Св. Ацев, Ст. Попов. Кн. *Эпидем., Микроб. и инфек. болести*, 1971, 2, 139—144.
10. Димитров, Ст., П. Панайотов, Г. Капреляни др. *Педиатрия*, 5, 1966, 1, 50—54.

11. Капрелян, Г. Диссертация, 1970.
12. Parrot, R. H., W. P. Rowe, R. J. Huebner et al. *New. Engl. J. Med.*, 1954, 251, 1087—1090.
13. Jones, B. R. *Proc. Royal Soc. of Med.*, 1957, 50, 758—760.

ЭТИОЛОГИЧЕСКАЯ ХАРАКТЕРИСТИКА АДЕНОВИРУСНЫХ ИНФЕКЦИЙ В ВАРНЕНСКОМ ОКРУГЕ ЗА ПЕРИОД С 1969 ПО 1971 ГОД

Г. Капрелян

РЕЗЮМЕ

При помощи вирусологических и серологических методик изучили 1214 заблещивших детей и взрослых острыми дыхательными заболеваниями (ОДЗ) в течение эпидемического и межэпидемического периодов гриппозной инфекции. Выделили на куриные эмбрионы 35 штаммов гриппозного вируса А₂, а на клеточные культуры ЧЕБ, ЧЕФ, HeLa и др. 31 штамм аденовирусов — серотипов 3—7. При серологических исследованиях 540 двойных сывороток, взятых у заблещивших ОДЗ в различные сезоны, установили аденовирусную этиологию в 27,1—41,5% исследованных сывороток. Приследили роль аденовирусных серотипов 3—7 в этиологии ОДЗ в различных возрастных группах и установили различные клинические диагнозы. Смешанные инфекции, вызванные аденовирусами и вирусами гриппа, составляли 3,5—5,2%, а адено- и RS-вирусов — 4,3—12,1%.