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# NEUROINFECTIONS IN PEOPLE OVER 60

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**SUMMARY**

**We live in a world in which more people live to a ripe old age. According to UNO official data one of the main features of 21 century is the demographic aging of the population on Earth.**
**A major part of the infectious pathology are the neuroinfections. They occur in all ages including old people with destructive results. So we set the task of studing the process of neuroinfections in patients over 60.**
**29 people with neuroinfections over 60 were examined at the Ist clinic of infectious diseases- "St. Marina" hospital for the period 2000-2004 year. 15 of them were men and 14 women. The hospital stay was 21,4 ±10,15 beddays (p <0,05). We used a control group of 30 patients at the age of 18 to 57 years with a hospital stay 17,46 ±3,97 beddays to compare with. Clinico epidemologic, biochemic and microbiologic methods were used to set the diagnosis. With suppurative meningitis were 75,86% of the old people and 24,13% had serous mengitis. 41,37% weer ethiologically proved. A leading role among the pathogens had. Str. pneum., St. aureus, S. marcesceus. The mortality was 24,13%. The clinical course, the seriousness, the outcome and the treatment of the disease were discussed in both groups.**
**We came to the following conclusions: The hospitalization of old patients is definitely longer; In patients from "60+" group serious and intermediate clinical forms prevail; In old people the commonest agents are bacteria, mostly Str. pneumonia.**

**Keywords**: neuroinfections, old people, meningitis

We live in a world in which more people live to a ripe old age. According to UNO official data one of the main features of 21 century is the demographic aging of the population on Earth.

A major part of the infectious pathology are the neuroinfections. They occur in all ages, including old people with destructive results. In healthy old people many physiological functions are held in basic condition, and their decrease in most organs, systems and homeostatic mechanisms appear when the system is overloaded and put in stress. Besides chronic diseases with multifactorial ethiology become more frequent with age.

The diseases of the nervous system are caused by internal and external agents. The internal agents are: circulatory disorders (arterio and atherosclerosis), metabolic and endocrine disorders, etc.

Circulatory disorders lead to serious impairment of the functions and the structure of the nervous system. Atherosclerosis and arteriosclerosis may cause impairment through bad irrigation of nervous cells in different parts of the brain. If the cerebral cortex is damaged a senile demntia develops. The subcortical nuclei are also often damaged together with the cortex. Very common are the indirect injuries which are a result of the blood vessels impairment (embolism, haemorrhage, thrombosis) which lead to the so called apoplexy. If the cortex impairment is not massive they pass away fast; fatal is the impairment of the vital subcortical centers (vasomotorial, respiratory and cardiac). The microcirculatory injuries of the nervous system can be secondary because of arterial disorders as well as primary injuries. It is worth to pay attention to the primary impairment of the microcirculatory course. They can be: toxic, infectious, infectious-allergic, insufficiency. Some of them such as the infectious-allergic (rheumatoid lesions of the microcirculation) may be manifested together with complex mental and neural symptoms and to imitate serious psychic and nervous diseases. Metabolic intoxication belongs to the internal factors too (diabetic coma, uremia, hyperthermy, etc.) as well as disorders of the endocrine functions. Benign and malignant tumors are also included here. The frequency of meningitis is higher in eldrly people. The Diseases Control Center in Atlanta (DCC) found that the common pathogens of meningitis in old people are 5. The diagnosis is an unique challenge because of the lack of typical signs and symptoms. Very serious conditions such as an acute heart attack, hyperthyroidism and

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intraabdominal infections could be manifested atypically in old people such as meningitis.
So we intend to study the process of neuroinfections in patients over 60.

## MATERIALS AND METHODS

29 people with neuroinfections over 60 were examined and treated at I clinic of infectious diseases - "St. Marina" hospital for the period 200-2004 year. 15 of them were men (51, 72%) and 14 women (48, 27%). The hospital stay was 21,4 ±10,15 beddays (p 0,05). We used a control group of 30 persons at the age of 18 to 57 with hospital stay 17,45 ±3,97 beddays (p ),05) to compare with.
Clinicoepidemiologic, biochemic and microbiologic methods were used to set the diagnosis. The consciousness was defined on the Glasgow liege scale.
For the criteria of the heaviness of the disease were used: the general condition, changes of consciousness, temperature, neurological manifestations, clinical signs of organ damage, laboratory results – haemogramma with leukogramma, thrombocytes, cerebro spinal fluid results, haemostatic factors, liver enzymes, nitric bodies, duration of hospitalization. Results and discussion: Investigation in 27 counries found that the frequency of bacteria meningitis was 3/ 100 000 (3,4). Investigation in USA showed that meningitis in patients over 60 was found in 2-9/ 100 000 which presumes that meningitis occur more often in old people than in the whole population. DCC found 5 most

*Tabl. 1. Neuroinfections in patients over 60ty*

| Years | Suppurative | | | Serous | |
|---|---|---|---|---|---|
| | proved | | Not proved | Proved | Not proved |
| 60+ suppurative 75,86% serous 24,13% | Str.pneum | 10 | 10 | 2 | 5 |
| | Seratia mar | 1 | | | |
| | St.aureus | 1 | | | |
| 18-59r. suppurative-30% serous-70% | Haem.infl | 1 | 5 | 2 | 19 |
| | Str.pneum. | 3 | | | |

*Table 2. Accompaning diseases, hospitalization day*

| Years | Accompaning diseases | | | Hospitalization day | | |
|---|---|---|---|---|---|---|
| | Kind | Number | % | 1-3 days | 3-5 days | More than 5 days |
| | | 26 | 89,60% | | | |
| 60+ | Cerebrovascular disease | 4 | | 9 | 7 | 13 |
| | Hypertension | 15 | | | | |
| | Ischemic heart disease | 8 | | | | |
| | Diabetus mellitus | 4 | | | | |
| | Pneumopathia | 9 | | | | |
| | Acute renal failure | 2 | | | | |
| | Otitis | 4 | | | | |
| | Toxic myocarditis | 1 | | | | |
| 18-59 | | 11 | 36,66% | 13 | 8 | 9 |
| | Pneumonia | 3 | | | | |
| | Otitis | 1 | | | | |
| | Sepsis | 1 | | | | |
| | Cerebral traumatism | 1 | | | | |
| | Hypertension | 2 | | | | |
| | Cerebrovascular disease | 2 | | | | |
| | Sinusitis | 2 | | | | |
| | Spinal anesthesia | 2 | | | | |

common agents of meningitis: Str. pneum., N. meningitidrs, H. influenza, Str. of group B and lusteria monocytogenes. The same results are seen in our investigation (1,2,3,4,5,6).

found in 16,6% and the pathogens were Euteroviruses, H. inf., Str. pneum. NO one deceased in this group.
In the "60+" group 89,6% were with accompanying diseases – hypertension, , Ischaemic heart diseases, diabetes

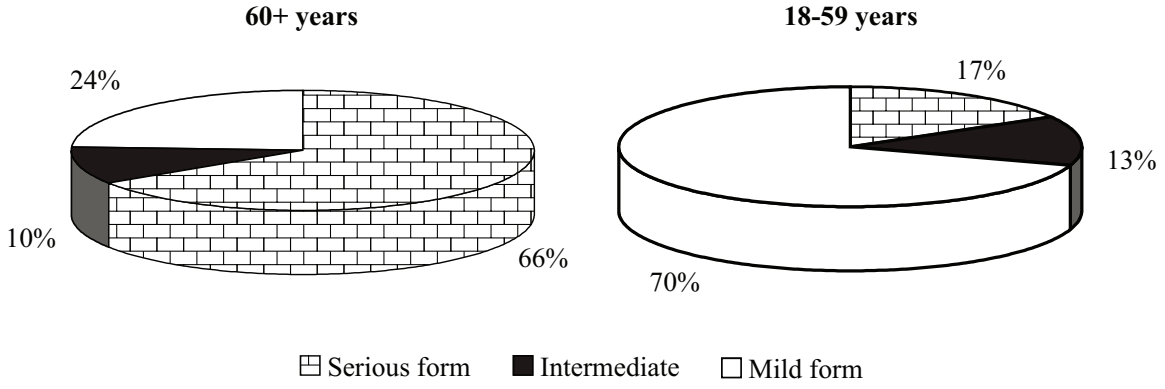


*Fig. 1. Clinical forms according to seriousness*

22 of the examined elderly people (75,86%) were with suppurative meningitis, 7 of them with serous (24,13%). The ethiology was found in 41,37% (table 1). Str. pneum., St. aureus, S. marcescens had a leading role among the agents.

*Table 3. Major symptoms in acute neuroinfections in patients of different ages*

| Major symptoms | 60+ group | Young group |
|---|---|---|
| Toxoinfectious syndrome | 100% | 100% |
| Temperature | | |
| 36,2-36,9 | 13,79% | 3,33% |
| 37,0-38,0 | 13,79% | 26,66% |
| 38,1-40,0 | 72,41% | 70,00% |
| Skin lesion | 0% | 0% |
| Hepatomegaly | 55,17% | 23,33% |
| Changes in consciousness | | |
| Coma | 27,58% | 10,00% |
| Sopor | 37,93% | 6,66% |
| Somnolence | 10,34% | 13,33% |
| In counsciousness | 24,13% | 70,00% |
| Leukocytosis | 86,20% | 76,66% |
| Increased sedimentation reaction | 79,31% | 36,66% |

The mortality in this group was 24,13%. 5 of the deceased were with suppurative meningitis and 2 – with serous. In the control group 30% of the patients were with suppurative meningitis and 70% with serous. The ethiology was

mellitus, cerebrovascular disease, pneumopathia etc.
In the control group 36,66% of the patients were with accompanying diseases– pneumonia otitis, sinuits, alcholic disease etc. (table 2). 65,51% of the eldrly people were with a serious clinical manifestation, 10,34% - with intermediate form and 24,13% -with mild form. In the group of younger people 16,66% were with serious form, 13,3% with intermediate and 70% were with mild. (fig. 1) As criteria for the heaviness of the disease were used: general condition, changes of consciousness, temperature, neurological manifestations, clinical signs or organ laboratory tests- haemogramma with leukogramma, thrombocytes, liquor, haumostatic factors, liver enzymes, nitric bodies, duration of hospitalization, etc.

*Table 4. Results from the liquor tests in acute neuroinfections*

| Indicators | Suppurative meningitis | Serous meningitis |
|---|---|---|
| Pandy reaction + | 70,96% | 39,28% |
| Pavlovich reaction + | 67,74% | 14,28% |
| Rivalta reaction + | 54,83% | 3,57% |
| Increased protein | 67,74% | 28,57% |
| Decreased sugar | 35,48% | 14,28% |
| Cl-changed | 12,90% | 7,14% |
| Cells - pleocytosis | | |
| - granulocytes 90% | 74,19% | - |
| - mononuclear 90% | - | 35,71% |

In patients from both groups there was a well-manifested temperature reaction – 72,41% of "60+" group and 70% of the control group were with temperature 38,6-40° 13,79%

respectively 26,66% were with subfebrile temperature and 13,78% vs 3,33% were non febrile. Leukocytosis was found in 86,2% of elderly patients and in 76,66% of young patients. Sedimentation reaction (SR) was increased in 79,31% of patients over 60ty, while in young people only in 36,66%. In coma were 27,58% of old ones and only 20% of young ones. 70% of the latter were without changes of consciousness. In both groups a well-defined Meningo-radicular irritation syndrome was found .

In old people were found more often pathological reflexes of Babinski group (43,37 vs 10%). In 41,37% of patients over 60 increased levels of urea and creatinin were found, while in younger ones -only in 3,3%. Hepatomegaly was more frequent in old patients (55,17% vs 23,3%)(table 3). Suppurative meningitis in both old and young people run seriously. In "60+" group 8 of the patients were in coma, while in the "young" group – 3 patients. 5 of the old patients with suppurative meningitis died and no one from the younger group. In 2 patients from"60+" there were residual manifestations (partial paralysis) and in younger ones- they were not observed .Serous meningitis runs seriously in the ages over 60. 2 of the observed patients with serous meningitis died, while in younger ones there were no deaths.

The most common clinical signs are changes in mental status and confusion;according bibliographic data 50% of the cases (4,5) and 35,2% of our cases. In old people we can not rely on Kerning and Brudzinski sign. In hospitalised people without meningitis 12% were Kerning positive and 18% - Brudzinski positive, 35% had cervical stiffness. It is mostly a result of cervical ankylosis or Parkinson's disease. In our "60+"group 100% of the patients had cervical stiffness, Kerning sign in 72,6%, Brudzinski sign in 18%. Diagnosis was set on a lumbar puncture. The liquor find was typical. There was no difference between the elderly group and the young one. The difference was between bacterial and serous meningitis (table 4). Liquor protein was extremely high in suppurative meningitis 2-5 g/l , in one of the patients -up to 9,8 g/l . Liquor sugar was reduced to 0,4-0,1. A significant pleocytosis was available in suppurative meningitis – to 15 000 leuc /$mm^3$ and 90% were neutrophils (Sg). Bacteria were the most common cause for meningitis in the elderly group.

Penetrating the CNS in old people occurs in 2 ways:

- Invasion of CNS on a bacterimia episode.
- Mechanical breakthrough of meninges (trauma, neurosurgical operation, spinal anesthesia).

3 of the examined patients had a spinal anesthesia – one over 60 and 2 of the younger ones. In the patient T.K.M. at the age of 69 who had undergone an inguinal hernia operation 5 days before the hospitalization, spinal anesthesia was applied. The postoperative period was smooth. 2 days before the hospitalization at the infectious clinic his temperature rose to 38,6,with a headache and vomiting. He was admitted in consciousness with defined cervical stiffness, Kerning "+", Brudzinski"-". From rachiculture Serratia marcescens was isolated. The patient was treated 51 days. The neurological status was brought to normal but an anxiety-depressive disorder was persistent. The isolated Serratia is a resistant hospital strain followed by a difficult and expensive treatment. The illness ran with a slow recovery period.

A 40 year old patient – P.N.D., 24h after an inguinal hernia operation raised t° to 37,8,with vomitting and a headache. Cervical stiffness positive Kerning positive, liquor as in suppurative meningitis were available. The rachiculture was sterile. The patient was discharged healthy after a 10 day treatment.

The other patient – 36 year- old woman, had her hemorrhoids removed with spinal anesthesia. A day after the operation she raised t°, had a headache, vomited ,there were changes in consciousness. Cervical stiffness was observed. The headache and subfebrile t° persisted 20 days. From the first rachiculture alpha hemolytic Str. was isolated, the control one was sterile. The woman was treated 25 days.

There has been a higher frequency of St. aureus and CNS lately. St. is mostly found after neurosurgical operations. In USA the suppurative meningitis cases caused by Str. pneum. are1,9/ 100 000 per year. Its frequency is 3 times higher in old people than L. monocytogenes. We can not discuss the frequency of L. in our patients as we have no opportunities for doing tests.

M. tuberculosis is a rare infection, but it should be taken in mind. Others are Cryptococcus neoformans or non-infectious agents – lymphoma, cancer, sarcordosis, drugs or colagenosis. TBC meningitis is 13% of meningitis cases in old people (3,4).

Changes in mental status without meningeal symptoms, weakness, subfebrile t°, intermittent headache, personal changes, confusion, vomitting, paralysis of cranial nerves. The diagnosis requires a high degree of accuracy. In 2 of our old patients we suspected TBC infection but the agent was not proved. We carried out a specific for TBC treatment.

Cryptoccocus meningitis is found in 4% of old people without HIV.

"Aseptic" meningitis – viral is found in 22% in old people according to literature data with a typical find in liquor. In the "60+" group 24,13% were with serous meningitis which confirms once again the importance of a precise microbiologic and viral diagnosis.

According to literature data 21% of the cases in the elderly ill patients are lethal (3,4,5,6), in our group of examined patients the mortality was 24,13%.

Risc factors for high mortality, according to authors like Grossley, Miller are alchoholismus, splenectomy, chronic hepatic and renal diseases, neoplasms. Often no immune disorders are found. The deceased patients observed by us were hospitalized with a delay, with a lot of accompaning diseases,renal insufficiency,poor social and economic status.

For the treatment of both groups ethiologic drugs were used with the aim of reaching an optimum cerebrospinal and serum bactericidal concentration of chemotherapeutics. Penicillin, Ampicillin, Cephalosporines III generation, Aminoglucosides, Chloramphenicol were often used in

combination ,monotherapy was rare. On the other hand special attention was paid to the pathogenic treatment–getting cerebral oedema under control, prevention of mortality and residual manifestations. A symptomatic treatment as well as treatment of the accompanying diseases were also carried out.

Using this study we can make the following conclusions:

- The hospitalization period of old patients is definitely longer.
- In "60+"group serious and intermediate clinical forms prevail.
- The most common ethiological agents in old patients are bacteria, among wich Str. Pneum. predominate.

On this conclusion we make the following recommendations:

1. To draw the GPs' attention on the risks of neuroinfections in old aged patients, the late diagnosis and treatment.
2. People over 60 and those at risk to be prevented with 23 valent Str. vaccine.

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