IN SEVERE TRAUMA PATIENTS (ACCORDING TO AUTOPSY DATA)

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ABSTRACT

Objectives: Nosocomial pneumonia (NP) is one of the most serious infectious complications in severe trauma patients, especially in those who receive mechanical ventilation. Data on the prevalence and etiology of NP in severe trauma patients are scarce as diagnostics of NP is difficult and in some cases NP remains undiagnosed. Thus, the objective of our study was to assess prevalence and etiology of NP in died patients with severe trauma.

Methods: Retrospective analysis of medical records and autopsy protocols of died patient from 2 trauma and 1 neurosurgery units of Clinical Hospital of Emergency Medicine.

Results: Among 9771 trauma patients hospitalized in 2001-03 the overall mortality rate was 4,7%. Autopsy was performed in 411/458 (89,7%) patients. Morphological signs of NP was found in 138 (33,6%) patients. NP was most common in patients with head trauma (79%). Mean age was 51,9±17,6 (21-89) years. Impaired consciousness presented in 97,1% patients; 84,1% patients were admitted to ICU, 78,3% patients were mechanically ventilated. Bilateral pneumonia was observed in 84,7% patients, right sided pneumonia - in 9,5% and left sided pneumonia - in 5,8%. In 47 (34,1%) cases NP was not diagnosed intravitally. Microbiologica investigation was performed in 21,7% cases. Among pathogens isolated *Ácinetobacter* spp. (20%), *Pseudomonas aeruginosa* (20%), *Klebsiella pneumoniae* (14%) and *Proteus mirabilis* (8%)

Conclusion: NP is a frequent infectious complication in severe trauma patients that is difficult to diagnose intravitally. The most common pathogens of NP in this category of patients are gram-negative bacteria that should be taken into consideration for choice of empirical

INTRODUCTION AND PURPOSE

Nosocomial pneumonia is an important problem of healthcare. Trauma patients present a population of risk for NP development, especially those who have severe head traumas and are mechanically ventilated, but data on prevalence and etiology of NP in this category of patients are limited. Thus the purposes of our study were:

- 1. To evaluate the prevalence of NP in trauma patients according to autopsy data.
- 2. To reveal the most common pathogens of NP in trauma patients.

METHODS

Retrospective analysis of medical records of died patients and autopsy protocols in 2001-03 in two trauma units (120 beds) and neurosurgery unit (40 beds) of Clinical Hospital of Emergency Medicine, Smolensk. Cases were excluded from analysis if length of hospitalization before death was less than 48 hours. For all included cases information on age, gender, unit, admission date, diagnosis, trauma characteristics, therapy, autopsy data, microbiology data were retrieved. Statistical analysis was performed using SAS (SAS Institute, USA, version 8.02 for Windows 98).

RESULTS

For the period studied among 9771 patients admitted to 2 trauma and 1 neurosurgery units 458 patients (4,7%) died. Autopsy was performed in 411 cases, nosocomial pneumonia was revealed in 138 cases. Bilateral pneumonia was found in 117 (84,7%) cases, right sided pneumonia in 13 (9,5%) cases, left sided pneumonia - in 8 (5,8%) cases. NP was not diagnosed intravitally in 47 (34,1%)

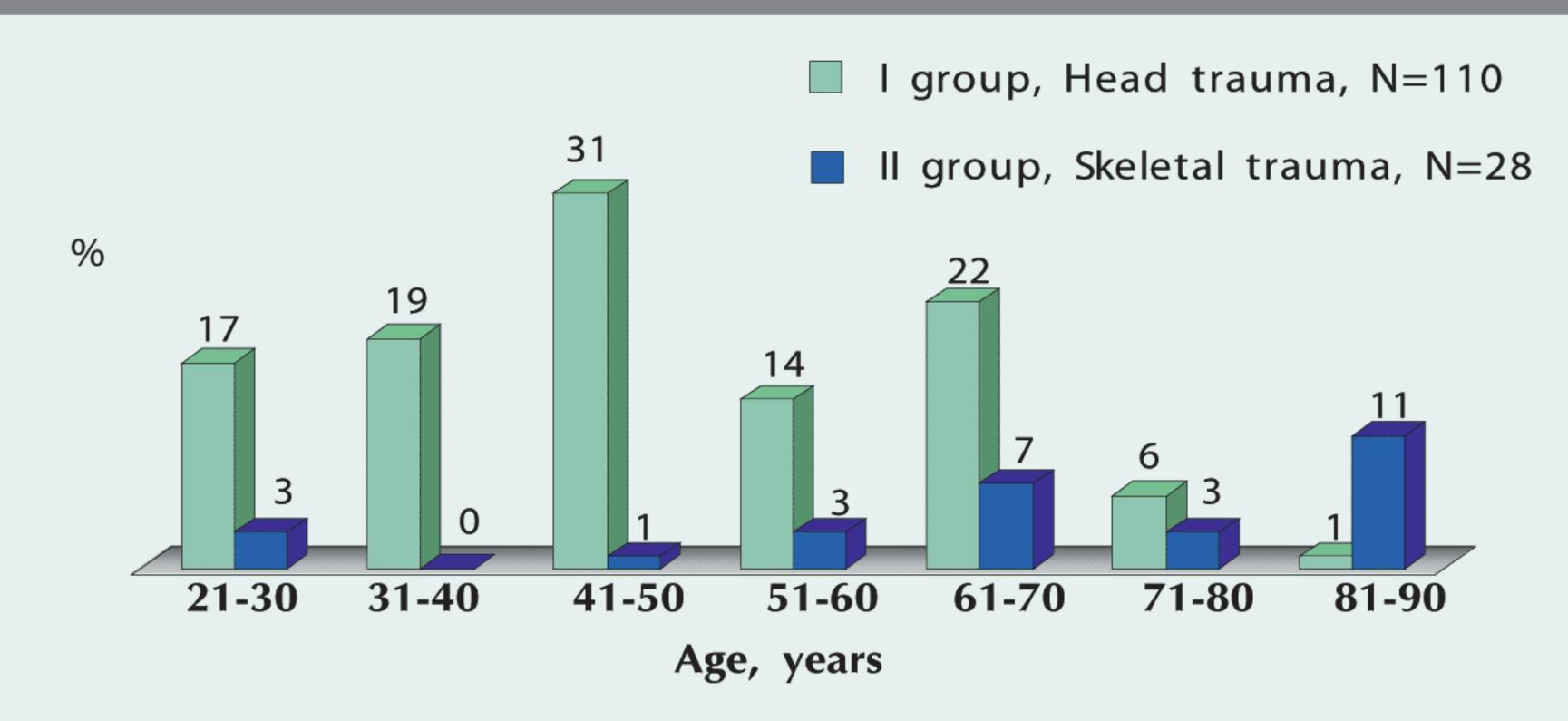
According to character of traumatic injuries patients were divided into 2 groups: I group included patients with predominantly severe head traumas from neurosurgery unit (N=110) и II group included patients with predominantly skeletal traumas from 2 trauma units (N=28).

Mean age was 51,9±17,6 (21-89) years, in I group -47,8±14,8 (21-81) years, in II group - 68,0±18,8 (25-89) years. Age distribution in both studied groups is presented on picture 1, gender distribution - in table 1.

Mean hospitalization length was 15,8±15,4 (4-86) days, in the I group - $12,6\pm10,8$ (4-55) and in group II - $28,3\pm23,1$ (4-86). More often patients with NP had severe head trauma (109/79% patients). Before NP onset 116 (84,1%) patients were in ICU and 108 (78,3%) were mechanically ventilated. Ventilator-associated pneumonia (VAP) was registered in 72 (52,2%) cases of NP. VAP developed during first 5 days of mechanical ventilation in 23 (31,9%) patients, after 5 days of mechanical ventilation - in 49 (68,1%) patients

Table 1. Gender characteristics of patients.

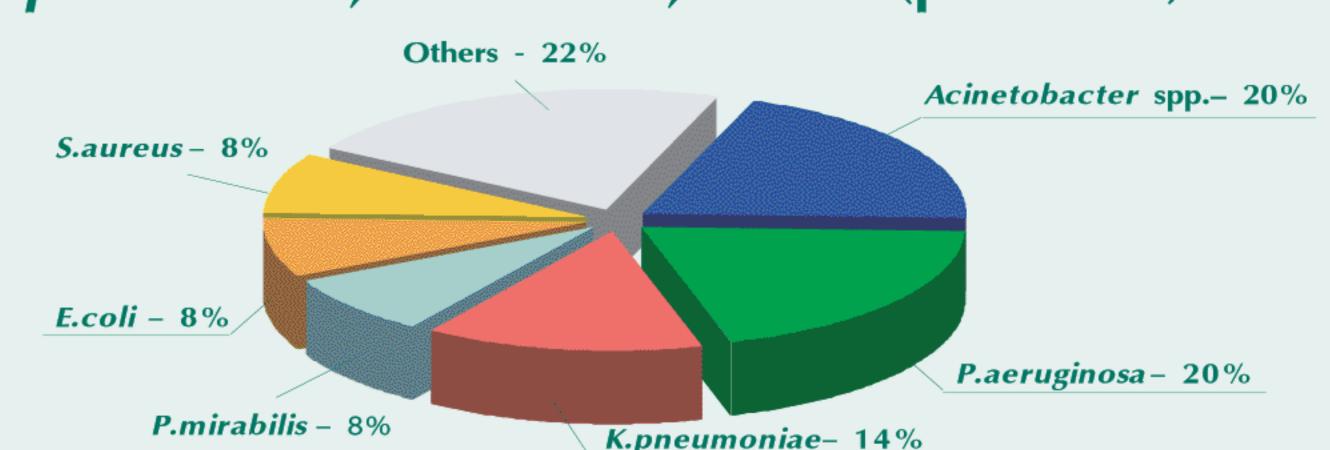
	Group I Head trauma, N (%)	Group II Skeletal trauma, N (%)	Both groups, N (%)
Males	96 (87,3%)	14 (50,0%)	110 (79,7%)
Females	14 (12,7%)	14 (50,0%)	28 (20,3%)



Picture 1. Age distribution of patients

In 134 (97,1%) patients different levels of consciousness impairment were revealed. One hundred and thirty patients (94,2%) were sedated and 34 patients (24,6%) received corticosteroids. Ninety patients (65,2%) were undergone surgery, 85 of them (94,5%) were endotracheally intubated.

Clinical characteristics of traumas are presented in table 2, characteristics of patients in terms of exposure to predisposing factors of NP is shown in table 3. Microbiology investigation was performed in 30 cases (21,7%), intravitally in 18 patients, postmortem - in 11, and in 1 case clinical specimens were taken both intravitally and postmortem. Clinical specimen for intravital microbiology investigation was sputum or bronchial aspirate, for postmortem microbiology - lung tissue. Most common pathogens isolated were Acinetobacter spp., P.aeruginosa, K.pneumoniae, P.mirabilis, E.coli (picture 2).



Picture 2. Pathogens isolated from respiratory specimens of trauma patients with NP.

Table 2. Characteristics of traumatic injuries in patients.

Traumatic injuries	Group I Head trauma, N (%)	Group II Skeletal trauma, N(%)	Both groups N (%)
Severe head trauma	103 (93,6%)	6 (21,4%)	109 (79%)
Skull fracture	41 (37,3%)	1 (3,6%)	42 (30,4%)
Brain concussion	2 (1,8%)	3 (10,7%)	5 (3,6%)
Mechanical asphyxia	2 (1,8%)	-	2 (1,5%)
Chest trauma	26 (23,6%)	7 (25%)	33 (23,9%)
Blunt abdominal trauma	8 (7,3%)	6 (21,4%)	14 (10,1%)
Upper extremities fractures	4 (3,6%)	5 (17,9%)	9 (6,5%)
Lower extremities fractures*	5 (4,6%)	10 (35,7%)	15 (10,9%)
Proximal femoral fracture	1 (0,9%)	14 (50%)	15 (10,9%)
Pelvic fractures	4 (3,6%)	5 (17,9%)	9 (6,5%)

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Table 3. Characteristics of patients in terms of exposure to predisposing factors of NP.

Dradianasing factors	Group I	Group II Skeletal trauma, N (%)	Both groups N (%)
Predisposing factors	Head trauma, N (%)		
Aged > 65 years	16 (14,6%)	18 (64,3%)	34 (24,6%)
Consciousness impairment	110 (100%)	24 (85,7%)	134 (97,1%)
Chest trauma	30 (27,3%)	7 (25%)	37 (26,8%)
Previous surgery	79 (71,8%)	11 (39,3%)	90 (65,2%)
ICU admission	104 (94,6%)	12 (42,9%)	116 (84,1%)
Mechanical ventilation	101 (91,8%)	7 (25%)	108 (78,3%)
Endotracheal intubation	78 (70,9%)	7 (25%)	85 (61,6%)
Previous antibacterial	105 (95,5%)	20 (71,4%)	125 (90,6%)
therapy			
Sedation	109 (99,1%)	21 (75%)	130 (94,2%)
Corticosteroids use	29 (26,4%)	5 (17,9%)	34 (24,6%)

CONCLUSIONS

- 1. NP is a common infectious complication in patients with severe head and skeletal trauma and was revealed in 33,6% trauma patients undergone autopsy.
- 2. NP in severe trauma patients is difficult to diagnose, according to our data NP remained undiagnosed in 34,1%
- 3. The most common pathogens of NP in trauma patients were gram-negative bacteria Acinetobacter spp., P.aeruginosa, K.pneumoniae that should be taken into consideration for empirical treatment.