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Total Quality Management of Medical Care Delivery at Acute Pneumonia Under Conditions of Rural Area

Methodical Recommendations for experts, chief physicians and medical specialists

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Team of Authors

1. Nechaev V.A.	Chief physician of Troitskaya CRH
2. Nechaeva R.V.	Deputy Chief Physician of Troitskaya CRH for Quality Expertise
3. Pyatchuk V.S.	Deputy Chief Physician of Troitskaya CRH for networking
4. Koroleva I.I.	Chief Therapist of Troitsky Area
5. Yegorova I.A.	Chief of Altayasky Kray Bureau for Accreditation and Licensing of Medical and Pharmaceutical Activity
6. Dracheva T.I.	Deputy Chief of Altaysky Kray Bureau for Accreditation and Licensing of Medical and Pharmaceutical Activity
7. Chernikov S.Yu.	ZdravReform Program Coordinator for Altay Kray
8. Stan Tillinghast	ZdravReform Program Quality Director

Introduction

Quality improvement of medical care, along with efficiency of medical activities, is among the urgent issues of improvement of regional health care systems and, in the long run, of the health status of population. The issues of TQM in medical care delivery, especially in rural areas, are of great importance now that the Russian law "On Mandatory Medical Insurance of the Population of the Russian Federation" is being implemented and health care reforms are under way.

The separation of medical care delivery from financing is a powerful factor of improving the system of delivery of medical services to consumers. Continuous quality control over medical care is a practical tool of improving the abovementioned system.

This work has been done due to close cooperation of the team of authors of Troitskaya CRH with the leading experts on medical care quality of the Altay Kray Bureau on Licensing and Accreditation of Medical and Pharmaceutical Activity and Intergovernmental Russain—American ZdravReform Program.

The authors aimed at showing approaches to system resolution of the problem of continuous quality improvement of medical care delivery under conditions of rural medical facilities when the diagnosis of acute pneumonia is stated in order to find ways of diminishing lethal outcomes and death rate because of this pathology.

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Acute Pneumonia — current status of the problem

Acute pneumonia is an acute infectuous—inflammatory process of parenchymal (alveolar) tissue with the presence of infiltrate in the lungs, as verified by roentgenography.

Clinical classification of acute pneumonias

1. Primary pneumonia (regular course).
2. Hospital pneumonia (nosoconial).
3. Aspiration pneumonia (after intubation anesthesia, in post—operation period, in weakened long—staying— in —bed patients, chronic alcohol abusers, etc.)
4. Atypical pneumonia (caused by viruses, Rickettsia, chlamidia, etc.)

5. At immunal disorders (AIDS, other immunodeficit states) prolonged pneumonia, often complicated.

NB! 1. Acute pneumonia should not be treated in out—patient facilities, even mild cases.
2. Patients with acute pneumonia should be put in the hospital within first 24 hours from the moment of stating the diagnosis.
3. Delay may mean development of complications and unfavourable outcome.

Pre—admission stage

Risk factors provoking pneumonias

Factor category	Factor name	Way of revealing
1. Connected with other diseases or states of organism	1. Influenza 2. Acute respiratory infections 3. Diseases of upper respiratory tracts: • sinusitis • pharyngitis • tonsillitis • bronchitis • bronchiectasia 4. Chest traumas 5. Immunodeficit diseases 6. Frequent and prolonged chills	1. Polls If pneumonia is suspected, these risk factors should be checked for absence or presence. 2. Study of medical documents: • medical records • receipts, etc.
2. Professional unhealthy conditions of work	1. Gas and dust in atmosphere 2. Work in hot shops (stokers, cooks, etc.) 3. Work with birds, animals.	1. Polls
3. Provoking factors	1. Alcohol 2. Smoking 3. Overcooling	1. Polls

During influenza epidemia, pneumonias join, as a rule, acute respiratory—viral diseases, especially in individuals suffering from diseases of upper respiratory tracts.

It is necessary to remember and know basic manifestations of acute pneumonias on the background of other diseases of lungs and upper respiratory tracts.

Name of disease	Traits of acute pneumonia
1. Influenza, ARD, angina. Typical in total blood counts: • leukopenia • neutropenia or norm NB! Patients with influenza and ARD require dynamic supervision in 2−3 days. When the sick leave is issued, it should be remembered!	On background of the given treatment − worsening of the general state on 2−3 day from the moment of disease development: • increase of body temperature accompanied by cold fits and worsening of health status; • in the total blood count (cito!) typical for pneumonia are: leukocytosis 8000 and up relating to stab neutrophile 4% and up For cito − X−ray examination of lungs!
2. Obstructive bronchitis. No high temparature at acute stage. Spell−like coughing.	Increase of body temperature accompanied by cold fits. Constant coughing. Changes in blood.
3. Purulent bronchitis. High body temperature, coughing with lots of sputum coctum (up to 50 g per 24 hours).	Worsening of the general state on background of the given treatment. Constant coughing.
4. Bronchiectatic disease. It is difficult to distinguish between aggrevation and joined pneumonia.	In case of bronchiectatic disease in the period of aggrevation and no signs of improvement due to the given treatment within first 2−3 days admission to the hospital is a must!

It is necessary to remember about non−typical course of pneumonia frequent in old people and children. It is characterised by general weakness with hyperhidrosis at normal or subfebrile body temperature. Blood indeces without deviations or probable increase of relating to stab neutrophile over 5% on the background of normal indeces of total blood count. For differential diagnostics obligatory is X−ray examination of lungs.

Hospital stage

Activities	Technique of accomplishment
1. Polls and physical examinations	Main complaints: increase of body temperature with cold fits; pain in the chest; coughing; slight dyspnea;

	weakness, sweating Physical examinations: by fingers – intensification of voice trembling within limited area; auscultatively – rigid breathing within limited area; wet and/or dry crepitations; signs of respiratory insufficiency – breath frequency may be 18 and more per minute; arterial pressure – normal or decreased; rapid pulse.
2. Additional laboratory tests.	1. Total blood count with formula. 2. Protein of acute inflammatory phase: fibrinogen (increased); SRB (positive); electrophonogram (decrease of albumin–globulin coefficient down to 1 and lower. 3. Creatinine. 4. Total analysis of urine (there may be protein at severe course of disease ("fever" protein).
3. Examination of sputum	1. Total analysis of sputum – increase of neutrophile leukocytes. 2. Bacteriological examination with Gram–colouring. 3. Inoculation for microflora with definition of sensitivity to bacterial preparations.
4. Instrumental examinations	1. Electrocardiogram. 2. X–ray examination of lungs. Control is a must at discharge. Additional control is needed if the state worsens at the background of given treatment and complications are suspected.

Clinical degrees of severity of the course of acute pneumonia

Degree of severity	Clinical manifestations

1. Light degree	Slight intoxication. Clear consciousness. Cold fits up to 38C. Tachycardia up to 90 beats/min. Arterial pressure − normal. Slight dyspnea at stress, no at rest. Small destruction focus in the roentgenogram.
2. Medium severity degree	Intoxication of medium intensity. Clear consciousness, light euphoria. Body temperature up to 39C. Hydrosis, weakness. Tachycardia up to 100 beats/min. Moderate decrease of arterial pressure. Dyspnea in rest − up to 30 breathings/min. Considerable infiltration of pulmonary tissue in the roengenogram.
3. Severe degree Treatment in rescucitation wards or intensive care units!	High intoxication. Body temperature 39−40C. Adynamia. Unclear consciousness. Tachycardia over 100 beats/min. Collaps (fall of arterial pressure). Dyspnea in rest − 36−40 breathings per minute. Cyanosis. Broad pulmonary infiltration. Frequent complications.

Criteria of selection of antibacterial therapy
It is necessary to remember about preparations of the first selection!

Type of pneumonia	Selection of preparations
1. Primary pneumonia (more often Gram−positive flora)	1. Therapy begins with prescription of penicillins. 2. In more severe cases: cephalosporins; rifampycin, etc.
2. Hospital and aspiration pneumonia (more often Gram−negative flora)	1. Aminoglycosides: gentamycin; canamycin, etc. 2. Cephalosporins (for medium and

	severe courses)
3. In case of disturbed immunity (more often Pseudomonas aeruginosa and Escherichia coli)	1. Aminoglycosides. 2. Cephalosporins of latest generation.
4. Atypical − mycoplasmic, ornitosal, leogenellesal, chlamidiosal, fungous, etc.	1. Erythromycins of latest generations: summamid, rulid. 2. Tetracyclins. 3. Linkomycins. For funguos types − nystatin, levorin. For destructive processes − cephalosporins: clopharan, cefsol, etc.

Principles of treating acute pneumonia

Type of therapy	Name
1. Antibacterial therapy	1. Antibiotics. 2. Sulfanilamides. 3. Nitrofurans. 4. Biceptol (bactrim).
2. Antiinflammatory therapy.	1. Pyrasolon group: metindol; indometacin; amidopyrin; reopyrin; analgin, etc. 2. Calcium chloride. 3. Prednisolon − indicated for severe courses with low arterial pressure.
3. Preparations for better bronchial drain .	1. Expectorants. 2. Sputum dilutants.
4. Desintoxication therapy at severe course and appearance of complications.	1. Freshly frosen plasma. 2. Blood substitutes. 3. Salt solutions. 4. Improving microcirculation: desagregants; anticoagulants of direct action. 5. Antifermental therapy.
5. Desensibilizing therapy as indicated.	1. Dimedrol. 2. Suprastin, tavegil, etc.
6. Resorptive therapy.	1. Physiotherapeutical procedures.

Principles of decision−making on correction and indicationof treatment at acute pneumonia

Days of treatment	Approaches
1. First day of stay in hospital	Approximate treatment for pneumonia.
2. On 2—3 day after bacteriological analysis.	Individual according to species of microbe.
3. On 6—10 day of correcting treatment.	According to sensitivy of microbes to antibacterial preparations.

Quality indicators of treating acute pneumonia

1. The specific weight of correctly indicated approximate treatment in first 24 hours after admission related to all treated patients with acute pneumonia.

2. The specific weight of individually selected antibacterial therapy related to all treated patients with acute pneumonia.

3. The specific weight of corrections for sensitivity during the treatment process related to all treated patients with acute pneumonia.

The most frequent complications at acute pneumonia

Name	Characteristic	Methods of treatment
1. Parapneumonic pleurisies.	May occur on background of pneumonias starting from 2—5 day, characterized by intensification of coughing and dyspnea (pleura irritation), weakening or disappearance of voice trembling and weakening of vesicular breath. The patient feels worse. X—ray examination reveals darkening in lungs on the damaged side with slanting liquid level, sinuses are full.	Diagnostic and curative pleurocentesis.
2. Methapneumonic pleurisies	Occur after pneumonia in 7—14 days and have severe course with probable accumulation	1. Diagnostic pleurocentesis. 2. Periodic curative pleurocenteses with

	of much of exudate in pleura with prolonged course of process. Objectively: dyspnea, tachycardia, decrease of arterial pressure, intensification of coughing, worsening of general state, weakness. X−ray examination: level of liquid. When empyema joins, suppurative intoxication appears − hectic fever with cold fits and hyperhydrosis.	evacuation of liquid. NB! Exudate should be examined. Appearance and increase of neutrofile leukocytes in exudate is a sign of developing empyema. 3. Surgeon's consultation about necessity of operative treatment.
3. Destruction (abscess formation) of lungs. Occurs more often when several risk factors exist, with account of age.	Appearance of much of suppurative sputum (up to 100 ml and more). Intensification of coughing with much of sputum. Increasing intoxication on background of given treatment. In lungs − at the location of pneumonic infiltrate rigid breath appears with amphoric shade and wet medium and/or large bubbling rale within limited area. total blood count: neutrophile leukocytosis with increasing related to stabs neutrphiles, high SOE; total urine analysis: protein appears. biochemical blood examination: increasing creatinine (indicator for proteins destruction), increasing fibrinogen, hypoproteinamia due to considerable decrease of albumins	1. Massive antibacterial therapy with preparations of broad action spectrum according to microbic species and their sensitivity to these preparations. 2. Antifermentative therapy of big doses of contrical or gordox. 3. To improve blood microcirculation: desagregants; direct anticoagulants. 4. Desintoxication and antishock therapy. 5. If arterial pressure decreases − vascular preparations (dopamin). Adrenalin and noradrenalin are not indicated for they cause disturbance of blood circulation in kidneys provoking vascular spasm. 6. Draining of abscess cavity.

PROGRAM
of organization and introduction of "Total quality management of medical care delivery" in Troitskaya central rural hospital in order to decrease mortality after acute pneumonia

Design of a new system of Total Quality MAnagement (TQM) is required for better organization and administration of medical care in rural areas.

Provision of qualified medical care depends to a great extent on correct critical analysis of existing technologies and results. The first program participants face the task of objective highly professional evaluation of the status of medical care delivery in the rural area as well as revealing unutilized resources in the management system.

This evaluation is rather complex and requires collective problem resolution. The work under TQM system will be directed at:

increase of professional skill of all health care providers;
efficient use of resources;
safety for patient, his satisfaction of the given treatment and care.

Main stages of introducing TQM program:

1. Establishment of a Medical Quality Council.
2. Stating of basic problems.
3. Study of the process of medical care delivery according to stated problem with investigation of deviations.
4. Selection of criteria (indicators) for quality assessment.
5. Gaining information.
6. Analysis with stating original causes.
7. Designing proposals for eliminating reasons as technological algorithms.
8. Introduction of the program.
9. Analysis of efficiency with statement of occured changes in the system of medical care delivery.
10. Generalizing experience in the form of methodical guidelines on problems.

The first problem of the new system of Total Quality Management became "Acute pneumonia".
Why this disease was specially selected? Acute pneumonia is one of the urgent problems of therapeutical service, ranks first in the structure of

hospital morbidity, is often accompanied by complicated course with unfavourable outcome as well as home mortality.

The primary tasks of the new TQM system for patients with acute pneumonia is improving the technology of medical care delivery at acute pneumonia:

1. To ensure timely diagnozing at the pre−admission stage and timely admission to the hospital. Thus, the goal is to improve knowledge of healthcare providers and save resources of the rural health care system at the expense of treating less seriously sick patients.

2. To select adequate therapy acoording to patients' state with account of etiological factor at the hospital stage of medical care delivery.

While analyzing acute pneumonia morbidity rate in the Troitsky area for the last three years, a considerable decrease of the number of such cases have been observed with a simultaneous increase of mortality rate, especially home (when medical care was not delivered), see Tab.1 and 2.

ANALYSIS
of acute pneumonia morbidity rate of adult population of the Troitsky area for 1993−1995 (per 1000 of adult population)

Table 1

Nosology	1993		1994		1995	
	abs. number	per 1000	abs. number	per 1000	abs. number	per 1000
Pneumonia code (MKB 9) 480, 483, 485, 486	134	4.8	125	4.5	70	2.5

Table 2

ANALYSIS
of acute pneumonia mortality of adult population of the Troitsky area for 1993−1995 (per 1000 of adult population)

Nosology	1993		1994		1995	
	abs. number	per 1000	abs. number	per 1000	abs. number	per 1000
Pneumonia code (MKB 9) 480, 483, 485, 486	3	0.10	5	0.18	5	0.18

Note: Adult population of the Troitsky area;

1993 — 27.6
1994 — 27.3
1995 — 27.5

The retrospective analysis is based on the study of medical documentation related to the diagnose of acute pneumonia. The analysis of medical documents was done according to an expert map approved for the territory of Altay Kray and consisting of four main blocks of the diagnostic—treatment process:

- block A — examination;
- block B — correctness of stated diagnose;
- block C — adequacy of treatment;
- block D — continuity of stages of medical care delivery.

Out of 240 studied medical records of patients treated for acute pneumonia, the following deviations were revealed (see Table 3).

Frequency of deviations (%) from standards of medical care delivery at acute pneumonia

Examination	Diagnosis	Adequacy of treatment	Continuity
13.3	69	42	11

In the block "Examination" the main cause of deviations was insufficient data collection about the patient:

- brief collection of complaints;
- brief collection of the history without finding out duration of disease and development of symptoms;
- inadequate physical examination.

Table 4

Frequency of deviations from examination standards (%) at stages of medical care delivery

PHP, PS, DH, RMA	Rural polyclinic	EAS	CRH
43.7	12.5	15.6	28.2

As seen from Tab.4, inadequate examination is more often observed in paramedics of paramedical stations and health posts and physicians of rural medical ambulances and district hospitals which may be attributed to lack of necessary knowledge, and also in physicians of the central rural hospital. More thoroughly information about patients is collected by therapists of the rural polyclinic and paramedics of the emergency ambulance station.

In the block "Diagnosis" out of 69% of all medical records it was noted that diagnoses failed to comply with modern requirements, classifications as well as the data gained from complaints, histories and examinations of patients (see Table 5).

Table 5

Frequency of deviations from standards (%) in the block "Stating diagnosis" at stages of medical care delivery

PHP, PS, DH, RMA	Rural polyclinic	EAS	CRH
41	12.3	16.4	30

Deviations in correctness of diagnosing according to stages of medical care delivery were proportionally equal to those of examination.

Inadequate collection of primary data about patients, together with inadequate examination, results in wrong diagnosing which is proved by the data tresented in Table 6.

Table 6

Frequency of deviation (%) between diagnoses of the pre—admission stage and final diagnosis "Acute pneumonia" at the hospital stage

Nosology	1993	1994	1995
Influenza	33.2	19.8	37.1
ARD	7.1	13.8	7.4
Chronical bronchytis	24.1	21.5	29.6
Bronchyectatic disease	8	9.6	3
Bronchial asthma	8.4	12.5	7.1
Lung cancer	5.6	6.4	8.9

Deviations in examinating patients followed by inadequate diagnoses lead to erroneous indications for treatment. In 42% of acute pneumonia cases deviations in treatment were met (see Table 7).

Table 7

Frequency of deviations from treatment standards (%) at stages of medical care delivery

PHP, PS, DH, RMA	Rural polyclinic	EAS	CRH
50.5	20	0.9	28.6

As seen from the Table, each second patient in the district hospital and rural medical ambulatory received wrong treatment; each third patient treated at CRH received inadequate therapy.

In addition, analysis of patients' medical records treated in in−patient medical facilities showed that 23% of patients developed complications of the main disease (see Table 8).

Table 8

Frequency of acute pneumonia complications (%)

Name	1993	1994	1995
Exudative pleurisy	22.1	23	11.2
Pulmonary edema	6.2	7.8	5.1
Infectuous−toxic shock	2.7	2.1	1.7
Abscess formation	2.2	2.1	1.7
Total:	33.2	36.3	23

Thus, within several years each 3−4th patient with acute pneumonia have been developing complications with unfavourable consequences which required additional spending of finances of the central rural hospital.

In 11% of cases deviations in continuity of acute pneumonia treatment at different stages of medical care delivery were found.

As follows from the abovestated analysis of medical care delivery to patients with acute pneumonia in Troitskaya central rural hospital:

1. Diagnostics of acute pneumonia is inefficient which demands advanced training at all levels of medical care delivery with formulation of standards and indicators of quality of delivering medical care at the pre−admission and hospital stages.

2. Incorrectness of hospital treatment and untimely recognition of complications requires the development of an algorithm of treatment and examination (according to days and hours) with account of severity of state and quality indicators for diagnostic wards, physicians and nurses participating in the treatment of this group of patients.