ACADEMICIA

ISSN: 2249-7137 Vol. 11, Issue 4, April 2021 Impact Factor: SJIF 2021 = 7.492

ACADEMICIA
An International Multidisciplinary Research Journal
(Double Blind Refereed & Peer Reviewed Journal)

DOI: 10.5958/2249-7137.2021.01192.7

REGIONAL PRETRACHEAL LYMPHATIC THERAPY OF PULMONARY COMPLICATIONS COVID-19

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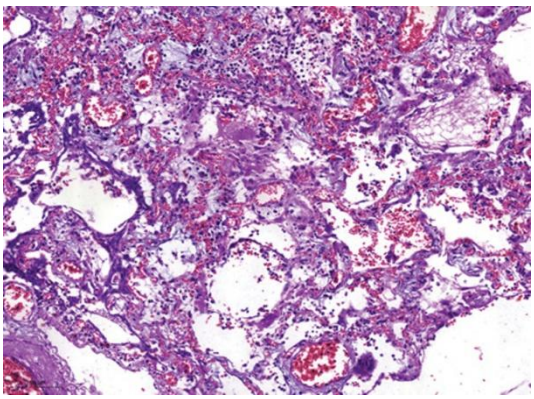
ABSTRACT

According to the latest data of radiation diagnosis and sectional studies, it became known that the most common clinical manifestation of a new version of COVID-19 coronavirus infection is pneumonitis or intersticiopathy. The scheme of pathomorphological changes in the lungs seems to be as follows: interstitial inflammation → Interstitial fibrosis (NSIP) • Fibrin → Organization → Interstitial fibrosis (OIP) • Metaplasia of the alveolar epithelium (Figi1,2), [2, 4,4].



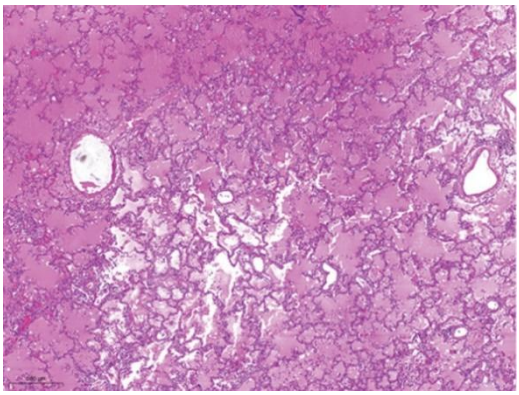


Fig. 1 Interstitial inflammation: Elemental myxoid stroma in the interstation of interalveolar partitions. Coloring hematoxylin and eosin, × 130.

Fig. 2 Intraalveolar expressed edema. Coloring hematoxylin and eosin, x25.

At the same time, traditional methods of anti-inflammatory and antibacterial therapy are often not effective, due to the pronounced edema and the impossibility of creating therapeutic concentrations of drugs in the lungs and the lymphatic system of affected mediastinal organs, which leads to a severe course of pathology accompanied by high death [1].

Purpose of the study

The study of gentamicin pharmacokinetics with pretracheallemfotropic antibiotic therapy and regional stimulation of the lungs' interstitial space's lymphatic drainage.

KEYWORDS: *Pretracheal Lymphatic Therapy, Covid-19, Pulmonary Complications*

INTRODUCTION

MATERIAL AND RESEARCH METHODS

Experimental studies consisted of three stages. The first stage consisted of a one-time administration with 50 gentamicin, in a dose of 30 mg/kg., One of the studied methods: lymphotrophic is pretracheal, using lymphodases and intramuscularly as a stimulator - lidases and intramuscularly, with subsequent thoracotomy, undertaken to withdraw the chest organs. cavities, paratracheal lymph nodes, and puncture of femoral veins, for blood collection. The second stage was to dynamically determine the concentration of gentamicin in the blood and the elevated tissues. The third stage is 10 outlets, the radionuclide method of Kety, using albumin I-131, the rate of lymphatic lung drainage was studied, with a pretracheal administration of a not concentrated lidase solution.

RESULTS AND ITS DISCUSSION

Analysis of the dynamics of gentamicin concentration during pretracheallymphotropic administration showed (Table 1), which the maximum concentration in the blood and tissues of respiratory organs is observed after 1 hour, as with intramuscular administration. In the serum, the concentration was 1 hour and 40.9 ± 0.49 μg / ml, and after 3 hours -25.9 ± 0.49 μg / ml. After 5 hours, the concentration exceeded such with intramuscular administration of 7 times,

constituting, 2.9 ± 0.1 μg / ml., (P<0.001). The area of concentration under curve -15.2 cm.2 in the tissues of paratracheal lymph nodes, in all times of the study, the antibiotic concentration significantly exceeded that observed with intramuscular administration (Fig. 3). The maximum concentration of gentamicin in an hour was equal to 90.5 ± 12.4 μg / mg., (35.5 ± 1.2 μg / mg - at V / m), after 3 hours - 56.3 ± 8,4 mg / mg ., (26.8 ± 0.2 μg / mg), in the future, during the day, the concentration decreases evenly. After 24 hours, the subtherapeutic level was maintained - 3.6 ± 0.19 μg / mg., (1.4 ± 0.12 μg / mg), (p <0.005). The total area of concentration under the curve under the paratracheallymphotropic administration is 41cm2., The area of concentration under the curve with intramuscular administration - 28.7 cm2

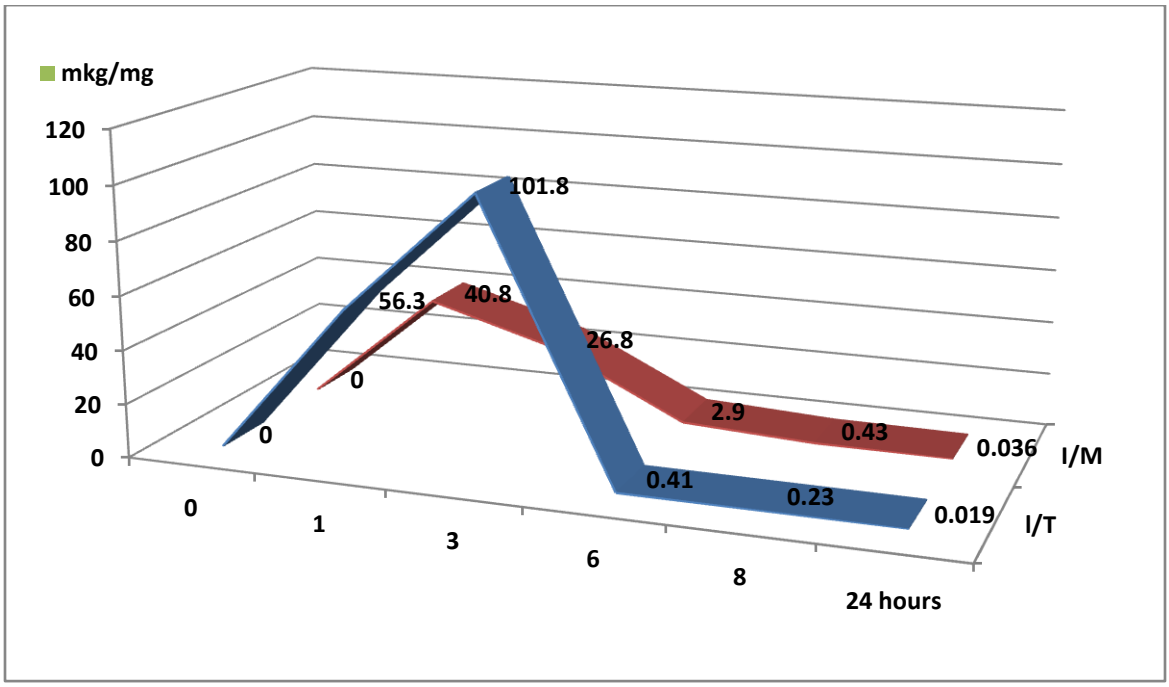


Fig.3. Dynamics of gentamicin concentration in paratracheal lymph nodes after single preaching lymphotropic and intramuscular administration.

In the tissues of the tracheal and bronchi, the maximum concentration of gentamicin after 1 hour is 80.3 ± 10.5 μg / mg, after 3 hours - 72.4 ± 9.3 μg / mg., (Fig. 4). After 5 and 8 hours, high therapeutic concentrations are held, after 24 hours the antibiotic content is maintained at the subtherapeutic level and equal to 4.9 ± 0.3 μg / mg, (3.7 ± 0.2 μg / mg at a per / m administration). The area of concentration under the curve is 47.0 cm2., (At a per / m administration - 24 cm2).

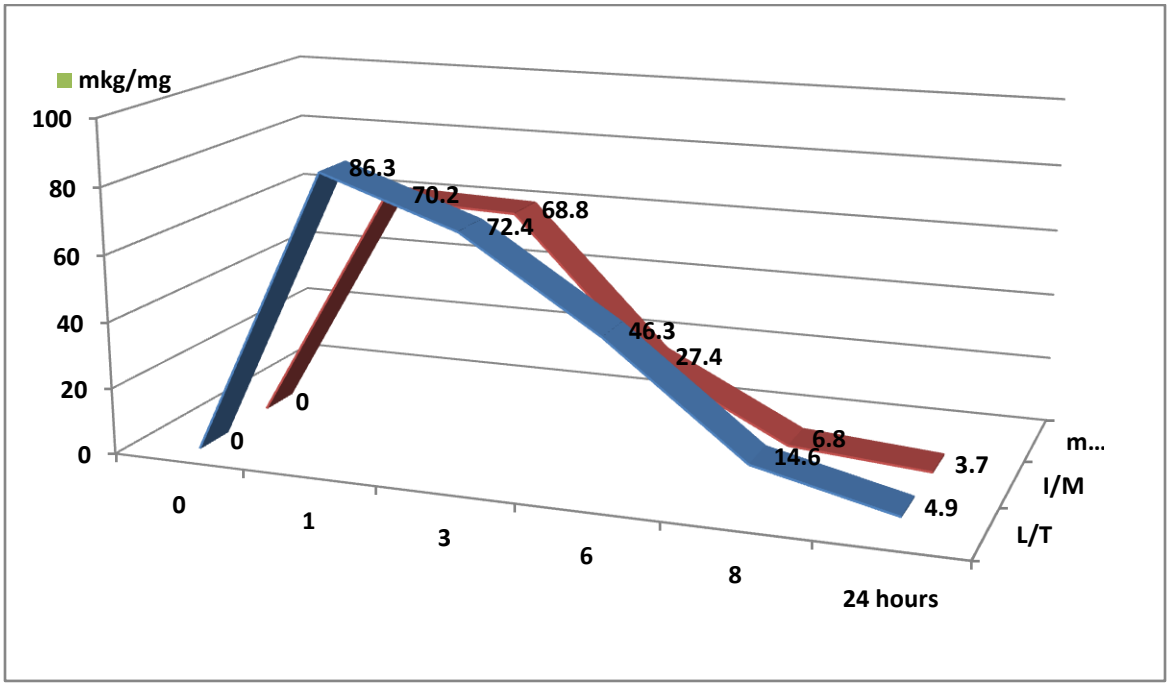


Fig.4 The dynamics of gentamicin concentration in trachea and bronchi after a single paratracheallymphotropic and intramuscular administration.

In the lungs, under pretracheallymphotropic administration, the content of gentamicin was 1 hour 102.4 ± 13.3 μg / mg, decreasing 3 hours to 63.3 ± 2.3 μg / mg., (Fig.5). During the day, its concentration decreases smoothly, after 24 hours it was 9.8 ± 0.44 μg / mg. and exceeded as 2 times compared with intramuscular administration. The concentration area under the curve is 50.9 cm2., (At the I / M of the introduction - 21 cm2), ($p < 0.005$). In the pleural tissue, the antibiotic content after 1 hour - 38.6 ± 3.2 μg / mg (23.9 ± 0.49 μg / mg at V / m), after 3 hours - 18.9 ± 0.97 μg / mg ., (6.2 ± 0.49 μg / mg), and within the remaining duration of observing the concentration of gentamicin at both methods of administration amounted to approximately the same values.

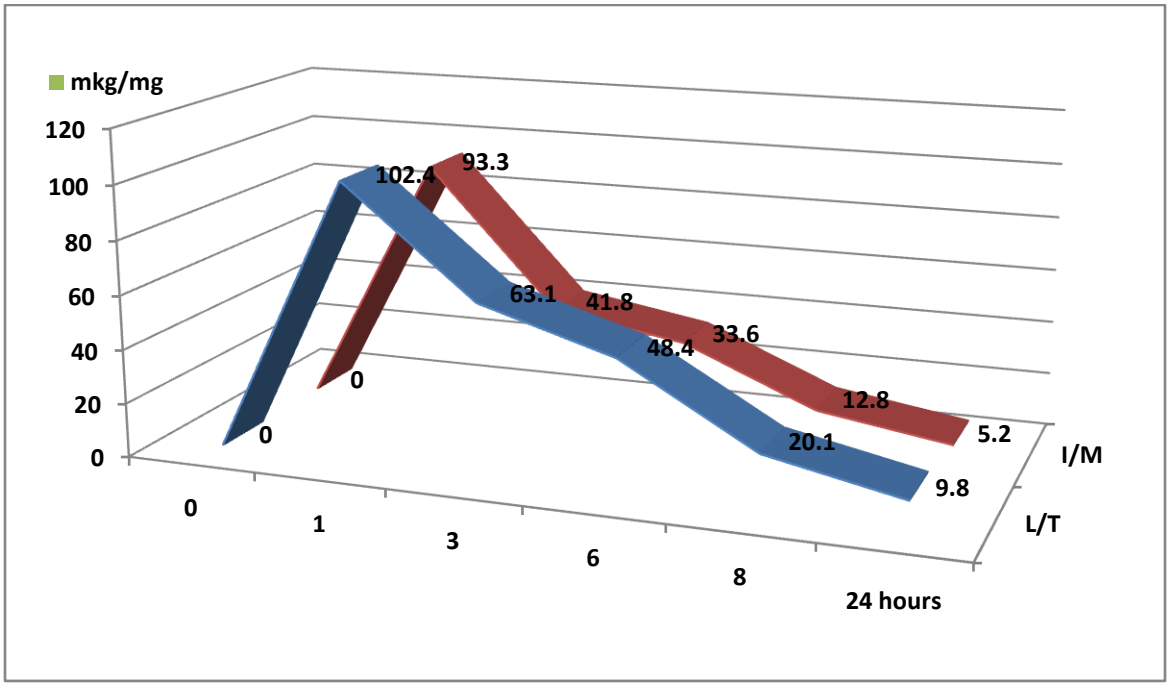


Fig.5 Changing the concentration of gentamicin in the pulmonary tissue after one-time paratracheallymphotropic and intramuscular administration.

TABLE 1 THE CONCENTRATION OF GENTAMICIN IN BLOOD SERUM (MG / ML) AND TISSUES (MG / MG) IN ONE-TIME INTRAMUSCULAR AND LYMPHOTROPIC PREACHING INTRODUCTION AT A DOSE OF 30 MG/KG

Biological substrate		Time after administration (h)				
		1	3	5	8	24
Blood in	i/m	238,2±18,2	101,8±7,8	0,41±0,06	0,23±0,02	0,019±0,004
	l/t	40,9±0,49	25,6±0,49	2,9±0,1	0,43±0,1	0,036±0,002
Paratracheallymphnodes	i/m	35,5±1,2	26,8±0,2	7,4±0,2	5,1±0,49	1,4±0,12
	l/t	90,5±12,4*	56,3±8,4*	13,9±1,2	6,7±1,02	3,6±0,19*
Trachea bronchi	i/m	70,2±7,3	68,8±10,1	27,4±0,5	6,5±0,1	3,7±0,2
	l/t	80,3±10,5*	72,4±9,3	45,3±2,4*	14,6±0,7*	4,9±0,3
Lights	i/m	93,3±3,2	41,8±2,3	33,5±0,6	12,8±1,2	5,2±0,46
	l/t	102,4±13,3	63,3±3,3*	48,9±0,5*	20,1±1,2*	9,8±0,44*
Pleura	i/	23,9±0,49	6,2±0,49	1,8±0,19	1,7±0,22	0,48±0,05

	m					
	l/t	**38,6±3,2***	**18,9±0,9 ***	**1,5±0,12**	**1,4±0,1**	**0,58±0,05**

Note B-eternal-free, L-lymphotropic method: * -dupportically different values at compared methods of administration (P <0.05).

The area of concentration under the curve is 13.2 cm2. The introduction of lidase into the preaching cellular space, as shown by our radionuclide studies, increase the lymphatic drainage of the interstitial space of the lungs by 120-180% (P< 00.5).

In the first clinical trials, on volunteers, the method of pretracheallymphotropic antibiotic therapy with regional lymph stimulation turned out to be very encouraging.

CONCLUSIONS

Analysis of data of pharmacokinetics and radionuclide study of lymph flow showed that the method of lymphotropicpretracheal administration of antibiotics and regional lymph stimulation may have advantages over the traditional methods of administering drugs in the treatment of pneumonitis (intersticiopathy) at COVID-19, due to higher and prolonged content of the latter in tissues and The lymphatic system of the bronchopulmonary system is the place of the largest cluster and the spread of infection, as well as the stimulation of the lymphatic lung drainage.

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