Chapter 26
New Anti-Microbial Treatment of Purulent-Inflammatory Lung Diseases in Patients Supported by Long-Term Artificial Ventilation of Lungs

F.G. Nazirov, R.A. Ibadov, Z.A. Shanieva, T.B. Ugarova, Kh.A. Kamilov, Z.N. Mansurov, and P.G. Komirenko

Abstract We analysed the spectrum of microbial agents causing bronchial-pulmonary complications in 52 patients who underwent various surgical interventions and were supported by long-term artificial ventilation of lungs. "FarGALS", a medication with high antimicrobial activity developed and produced at V.Vakhidov Republican Specialised Centre of Surgery, was used for the first time in the nebuliser therapy. In comparison with other antimicrobial agents, the use of "FarGALS" has reduced complications of long-period artificial ventilation, justifying further investigations of this medication for the use in nebuliser therapy by intensive care units (ICU).

Keywords Anti-microbial treatment • Intensive care • Nebuliser therapy

26.1 Introduction

Continuous improvement of technologies and methods of invasive respiratory support has led to wider indications for the use of artificial ventilation of lungs (AVL), and improved outcomes of intensive care of some critical conditions [1]. Despite this, the risks of developing of ventilation-associated pneumonia, angiogenic sepsis, multi-organ failure and other complications are still significant [2, 3]. The ventilator-associated pneumonia could be a separate complication or an additional complication of multi-organ failure [3, 4]. Search for new anti-microbial drugs remains a priority in the modern intensive care treatment of purulent-inflammatory lung diseases of patients supported by long-term artificial ventilation of lungs [5]. In 2004, a new anti-microbial drug "FarGALS" was developed and patented [6]. At present the domestically produced FarGALS medication is used in the various fields of medicine, such as surgery,

R.A. Ibadov (✉), F.G. Nazirov, Z.A. Shanieva, T.B. Ugarova, Kh.A. Kamilov, Z.N. Mansurov, and P.G. Komirenko
V.Vakhidov Republican Specialised Centre of Surgery, Tashkent, Uzbekistan
e-mail: tmsravshan@mail.ru

S. Mikhalovsky and A. Khajibaev (eds.), *Biodefence*, NATO Science for Peace and Security Series A: Chemistry and Biology, DOI 10.1007/978-94-007-0217-2_26,

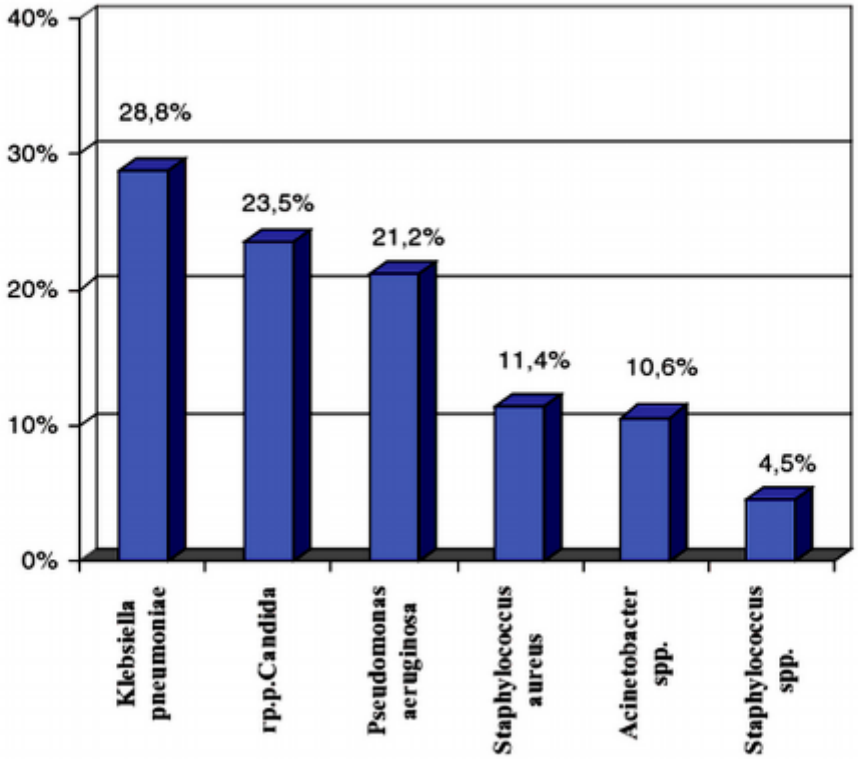

Fig. 26.1 Distribution of microorganisms found in the clinical samples

Table 26.3 Resistance of the extracted microflora to the medication

Antibiotic/ micro-organism	*P. aerugi-nosa*	*K. pneumo-niae*	*Acineto-bacter spp.*	*S. aureus*	*Staphylo-coccus spp.*	*Candida*
Amikacin	29.0%	34.0%	37.0%	54.0%	17.0%	*
Gentamicin	78.0%	81.0%	87.0%	82.0%	32.0%	*
Meropenem	24.0%	49.0%	54.0%	*	*	*
Ofloxacin	59.0%	62.0%	64.0%	32.0%	15.0%	*
Ciprofloxacin	68.0%	76.0%	81.0%	68.7%	33.0%	*
Cefotaxime	95.0%	100.0%	100.0%	92.0%	38.0%	*
Ceftazidime	96.0%	98.0%	100.0%	87.0%	66.6%	*
Ceftriaxone	89.0%	92.0%	94.0%	84.0%	17. 0%	*
Cefoperazone	78.0%	81.0%	84.0%	76.4%	7.0%	*
Polymyxin	6.0%	6.5%	4.0%	*	*	*
Nitroxolin	*	*	*	*	*	22.0%
Terbinafine	*	*	*	*	*	33.0%
Amphotericin	*	*	*	*	*	34.0%
Fluconazole	*	*	*	*	*	43.0%
FarGALS	0.2%	0.4%	0.7%	0.0%	0.0%	0.0%

Note: * Natural resistance

26.4 Conclusions

Gram-positive, gram-negative bacteria and fungi showed high sensitivity to a novel anti-microbial agent FarGALS. Its use in nebuliser therapy of patients with purulent postoperative lung diseases, who stay on artificial ventilation of lungs for a long time, reduced frequency of broncho-pulmonary complications from 25 to 10%. The use of FarGALS led to clinical improvement in 2–3 days, and overall improvement in 5–6 days, which is significantly faster than in the control group, which was treated with standard nebuliser therapy.

This study confirmed high activity of FarGALS for polyresistant microorganisms.

References

1. Skyler JS, Weinstock RS, Pascin P, Yale JF, Barrett E, Gerich JE, Gerstein HC (2005) Use of inhaled insulin in a basal/bolus insulin regimen in type 1 diabetic subjects A 16-month randomized, comparative trial. Diab Care 28(7):1630–1635
2. Frutos-Vivar F, Esteban A (2003) When to wean from a ventilator: an evidence-based strategy. Cleve Clin J Med 70(5):383–398
3. Cook D (2000) Ventilator-associated pneumonia: perspectives on the burden illness. Intensive Care Med 26(S1):31–37
4. MacIntyre NR, Cook DJ, Ely WE, Epstein SK, Fink JB, Heffner JE, Hess D, Hubmayer RD, Scheinhorn DJ (2001) Evidence-based guidelines for weaning and discontinuing ventilatory support. Chest 120(6):375–395
5. Kollef MH (2000) Ventilator-associated pneumonia: the importance of initial empiric antibiotic selection. Infect Med 17:278–283
6. Bajenov LG, Mustamov AN, Ekubjanov FT, Bajenova SS, Shanieva ZA (2008) Antimicrobal activity of the new biotechnological drug - ForGALS and its clinical use. Bull Int Sci Surg Assoc 3(1):23–25
7. Smaldone GC, McKenzie J, Cruz-Rivera M, Hoag JE (2000) Budesonide inhalation suspension is chemically compatible with other nebulizing formulations. Chest 118(4):98S
8. Boe J, Dennis JH, Driscoll BR (2001) European Respiratory Society guidelines on the use of nebulizers. Eur Respir J 18:228–242