PARENTERAL NUTRITION ADMIXTURES: REVIEW OF THE MICOBIOLOGICAL SAMPLING PLAN

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BACKGROUND AND IMPORTANCE

Sterility test of Parenteral Nutrition (PN), is described in pharmacopoeias and establishes the minimum number of units that must be tested. [1-3]

Normally, no quality control testing is performed for extemporaneously prepared products.[2,4] Even though, in our procedure, to evaluate the efficacy of the working method, samples are taken from personalized and stock PN mixtures as part of the process control (figure 1).

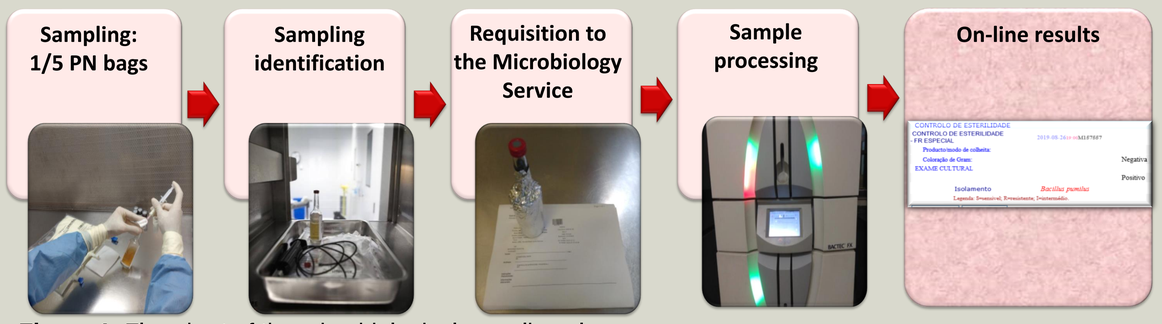

Figure 1. Flowchart of the microbiological sampling plan.

AIM AND OBJECTIVES

To evaluate the number of PN samples taken for microbiological control and its compliance with pharmacopoeial specifications.

To test the possibility of reducing on PN samples taken and economic impact associated.

MATERIALS AND METHODS

Retrospective study of the microbiological control of PN bags from October 2018 to September 2019. Data were obtained from pharmacy and microbiology laboratory records. The parameters measured were: PN bags produced, PN samples taken versus recommended by pharmacopoeial specifications.

Risk assessment approach and microbiological results since 2014 have also been performed. Costs were calculated considering the value of the sterility test.

RESULTS

As it can be seen in Table 1, during the studied period, 12466 PN bags were performed from which 1723 were tested. According to pharmacopoeial specifications, for a production less than 100 units, the minimum number of units to be tested should be 10% or 4 units, whichever is the greater (theoretical sample).

Table 1. Relation between the number of PN bags prepared/tested.

		PN bags	real sample	theoretical sample*
MON	Mean	49	7	5
	Sum	2611	394	
TUE	Mean	26	4	4
	Sum	1292	198	
WED	Mean	42	7	4
	Sum	2154	342	
THU	Mean	51	7	5
	Sum	2443	329	
FRI	Mean	76	9	8
	Sum	3966	460	
	Sum	12466	1723	

*minimum number of items to be tested in relation to the size of the batch given in Table 4.06-3 (EMEA/CHMP/ICH/645592/2008)

Four of the controlled bags had a positive result (0,23%), in red on table 2. In neither cases a clinic compatible with infection was verified or an isolation of the same microorganism in blood culture.

This number of positive results is in line with the history results since 2014 (table 3).

Table 2. Microorganisms identified in the PN samples since 2014.

Identification	N
Bacillus circulans	2
Bacillus megaterium	1
Bacillus pumilus (8/2019)	1
Bacillus simplex	1
Escherichia coli (8/2019)	1
Klebsiella oxytoca	1
Micrococcus luteus (11/2018)	1
Neisseria flava	2
Staphylococcus warneri	1
Streptococcus mutans	1
No strain recovery on cultural examination	4

Table 3. PN samples and positive controls since 2014.

	(2014-2019)
PN bags prepared	54748
PN bags tested	7026
Positive controls	16 (0,23%)

CONCLUSIONS AND RELEVANCE

The procedure in place consists of random sampling of 1 out of every 5 produced PN bags. These results, as well as the history of low and stable positive controls, will allow the increase of the sampling interval to 1/10. The predictable decrease in the number of analysis will imply a cost saving of about €9575/year. This reduction also improves the possibility of making other studies with the microbiology with better material and human resources management.

References and/or acknowledgements:
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2. USP, Chapter 71 Sterility Tests, The United States Pharmacopeial Convention. 35th revision: Rockville, MD; 2012.
3. Annex 6 to note for evaluation and recommendation of pharmacopoeial texts for use in the ich regions on sterility test general chapter. (EMEA/CHMP/ICH/645592/2008)
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