# QUANTITATIVE DETERMINATION OF THE BACTERIAL CONTAMINATION OF THE DOGS` INFECTED WOUNDS DURING THE TREATMENT

**A.V. Vardanyan, S.M. Ohanjanyan, E.A. Nikoghosyan, A.D. Haroutunyan**
***National Agrarian University of Armenia***
*74, Teryan Str., Yerevan, 009, Republic of Armenia; albert. vardanyan52@ mail.ru; Samvel.ohanjanyan68@mail.r; ,erik-nik69@yandex.ru;asmikharoutunyan52@ mail.ru*
Received: 02.05.15; accepted: 29.08.15

In modern clinical surgery it is considered that every wound is contaminated and infected by bacteria. Contamination can be primary and secondary . The primary contamination of the wounds takes place randomly or during gunshot injury, secondary during surgical operations and bandaging from violation of the rules of asepsis and antisepsis. The infection in wound develops when imbalance appears between infiltrated microorganisms and defense system of body appears and is accompanied by the signs of inflammation. From practical point of view the conversion of contaminated wound to infected depends on the degree of functional impairment of the damaged tissue and the virulence of infiltrated pathogens.

## INTRODUCTION

Infected wound recovery is difficult and multistage process that proceeds not only by local regeneration but also rebuilding of common immuno-biological receptors of organism, influencing on the systems of organs at various degree. So the wound shall not be seen as local inflammation is limited by only local treatment. The problem is that at different stages of wound recovery it is important to apply special approach and use the treatment methods specific for the certain phase and at the same time stimulate the immunity. That is why it is necessary to use proper medication in different phases of treatment for local and common treatment which has multifunctional influence and is easy to use from practical point of view. Application of this type of medicine will allow to increase the natural immunity of the animals and speed the recovery process. The development of infection can be more possible in the wounds that contains a lot of dead tissues which create favorable environment for the growth and development of infiltrated bacteria [1,2].

## OBJECTIVES AND METHODS

To study the bacterial insemination of the contaminated wounds the experiments were conducted on dogs in the clinic of the Chair of Therapy and Surgery National Agricultural University of Armenia. The animals were divided into two groups: control and experimental. The microbiological studies were made on 1st, 4th, 8th, 12th and 15th days. The quantitative determination of bacterial contamination was performed by the method of Goldi - Ryabinski-Rodman edition [3]. The plain agar was prepared and placed into Petri plates, the surface of each was divided into A,1,2,3 sections.

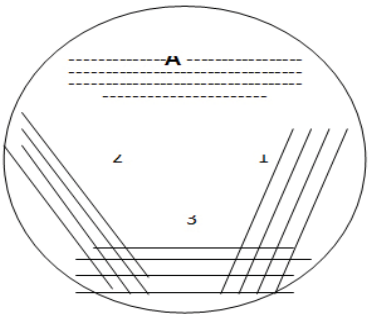


**Fig.** *Position of sectors A, 1, 2, 3*

Before the surgical management of the wound, 1g of substance was diluted in sterile tube with physiological solution in proportion 1:10. The obtained substance was scrolled by 3mm diameter bacterial loop performing 40 movements, in sector A of Petri plates. After the loop was flamed and cooled, the four lines were drawn: from sector A to sector 1, from sector 1 to 2, from sector 2 to 3. Afterwards the Petri plates were incubated in thermostat during 18-24 hours at 37ºC. The number of bacteria was counted by Gould's methodology. For the final result the data in the table is multiplied by 10.

RESULTS AND ANALYSIS

**Table 1.** *Numerical data of bacterial insemination of inflamed wounds*

| Number of bacteria in 1ml diluted exudate | The quantitative of colonies in Petri plate in different sectors | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| less than1000 | 1-6 | No growth | No growth | No growth |
| 1000 | 8-20 | No growth | No growth | No growth |
| 5000 | 20-30 | No growth | No growth | No growth |
| 10000 | 70-80 | No growth | No growth | No growth |
| 100000 | 100-150 | 5-10 | No growth | No growth |
| 500000 | more | 20-30 | No growth | No growth |
| 1000000 | more | 40-60 | No growth | No growth |
| 5000000 | more | 100-140 | 10-20 | No growth |
| 10000000 | more | more | 30-40 | No growth |
| 50000000 | more | more | 60-80 | Unit growth |
| 100000000 | more | more | 80-140 | till 25 |

In the Table 2 is presented the quantitative data of bacterial contamination of the dogs' infected wounds during the treatment by Vishnevsky`s liniment and Mukhin`s tincture.

On the first day of treatment in animals of both groups hydration stage was observed, there was out flow of purulent exudate, the wounds were contaminated, and their edges were swollen and red.

**Table 2.** *Numerical data of bacterial insemination of dogs' inflamed wounds (M+δ+m)*

| Group n-5 | The name of medicine | The days of the treatment | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 4 | 8 | 12 | 15 |
| Control | Vishnevski liniment | 100 mln±1,58±0,71 | 50 mln±2,55±1,14 | 5 mln ±2,24±1,0 | 100 K±3,16±1,41 | 10 K±0,71±0,32 |
| Experimental | Muchin tincture | 100 mln±2,19±0,83 | 10 mln±2,39±1,07* | 500 K±2,55±1,14* | 10 K ±2,0±0,89* | 0±0 ±0 |

P<0,05 *

The number of bacteria in 1ml of solution was 100 million.

On the 4th day of treatment we observed the traces of accumulation of the purulent exudate and obvious lesions of inflammation on the surface of the wounds. The number of bacteria in comparison with the previous test reduced: in wounds of the experimental group of animals by 90 million, i.e. 10 million were left; in control group of animals by 50 million, i.e. 50 million were left.

On the 8-th day of treatment there was no any purulent outflow, the sample was taken by the management of wound cavity with physiological solution. The number of bacteria reduced by 9.5 million in comparison with the previous test and constituted 500 thousand. In the control group of animals the purulent outflow was still present. The number of bacteria reduced by 45million and constituted 5 million.

On the day 12 of treatment the wounds of the experimental group of animals were covered with crust and to take the sample was used the crust after dilution by physiological solution. The number of bacteria in comparison of previous test reduced by 490 thousand and constituted 10 thousand and in control group of animals decreased by 4.9 million and made 100 thousand.

On the 15-th day of treatment in animals of the experimental group epitelization of wounds took places and the experiments were finished. From the wounds of

control group of animals the sample was taken after the management of wounds cavity by physiological solution. The number of bacteria in comparison with the previous test reduced by 90 thousand and assembled 10 thousand.

The results of experiments testify that in the experimental group of animals, treated by Mukhin`s tincture externally and internally the purulent outflow on 8- th day of treatment did not exist, on 12-th day the wounds were covered by crust, on the 15-th day total epitelization of wounds and its full recovery took place. On the 15-th day of management epitelization of wounds in animals of control group, treated by Vishnevsky`s ointment was not finished.The bacteria number significantly reduced and constituted 10 thousand.

## CONCLUSION

In modern clinical surgery is considered that every wound is contaminated and infected by bacteria. Contamination can be primary and secondary. The primary contamination of the wounds takes place randomly or during gunshot injury, secondary - during surgical operations and bandaging from violation of the rules of asepsis and antisepsis. The infection in wound develops whenimbalance appears between infiltrated microorganisms and defence system of body appears and accompanied by the signs of inflammation. From practical point of view the conversion of contaminated wound to infected depends on the degree of functional impairment of the damaged tissue and the virulence of infiltrated pathogens.

To study the bacterial insemination of the contaminated wounds the experiments were conducted on dogs in the clinic of the Chair of Therapy and Surgery National Agricultural University of Armenia. The animals were divided into two groups: control and experimental. The microbiological studies were made on 1st, 4th, 8th, 12th and 15th days. The quantitative determination of bacterial contamination was performed by the method of Goldi - Ryabinski-Rodman edition. The plain agar was prepared and placed into Petri plates, the surface of each was divided into A,1,2,3 sections.

The results of the experiments testify that in the experimental group of animals, treated by Mukhin tincture externally and internally the purulent outflow on 8- th day of treatment did not exist, on 12-th day the wounds were covered by crust, on the 15-th day total epitelization of wounds and its full recovery took place. On the 15-th day of management epitelization of wounds in animals of control group, treated by Vishnevsky`s ointment was not finished.. The bacteria number significantly reduced and constituted 10 thousand.

## REFERENCES


1. *Struchkov V.I., Gostishchev V.K.,Struchkov Yu.V.* Total and Local Purulent Infection // J. of AMS of USSR, 8, 1983, pp. 3-7 (in Russian).

2. *Shaposhnikov Yu.G.., Vishnevskij A.V.* Diagnostics and Management of Trauma // "Medicina", Moscow, 1984, 210 pp. (in Russian).

3. *Ostrin P.I., Danilov G.V.,Rodman B.G.* The Quantitative Method of Definition of Bacterial Insemination of Infected Wounds // Soviet Medicine, 10, 1985, pp. 99-100 (in Russian).


## КОЛИЧЕСТВЕННОЕ ОПРЕДЕЛЕНИЕ МИКРОБИАЛЬНОЙ ЗАГРЯЗНЕННОСТИ ЗАРЯЖЕННЫХ РАН У СОБАК ПРИ ЛЕЧЕНИИ


**А.В. Варданян, С.М.Оганджанян, Э.А. Никогосян, А.Д. Арутюнян**



С целью изучения микробиальной загрязненности заряженных ран в клинике кафедры терапии и хирургии, а так же на кафедре микробиологии и вирусологии Национального аграрного университета Армении были проведены микробиологические исследования на собаках, которых разделили на две группы- контрольную и опытную. Микробиологические исследования были проведены на 1,4,8,12 и 15 дни лечения. Количественное определение микробной активности было проведено по методу Голда, в модификации Романовского-Гимзы. Результаты исследований свидетельствуют, что из ран животных опытной группы для лечения которых был использован наружно и внутренне экстрат Мухина на 8 день лечения отсутствует гнойное истечение, на 12 день раны были покрыты коркой, а на 15 день раны были полностью эпителизированы. У животных контрольной группы, которых лечили линиментом Вишневского, эпителизация ран к 15 дню лечения все еще не была завершена, однако микробиальная загрязненность была резко снижена, составляя 10000 микробных тел.