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Possibilities of telemedicine in work to improve survival in multiple trauma victims

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Abstract

Background: World experience in providing medical assistance to victims of trauma indicates high efficiency of telemedicine methods in organization of medical care to trauma victims and an effective and adequate implementation of therapeutic and diagnostic measures.
Material and methods: We made some analyses of the necessity of the telemedicine consultation and control in 1150 patients with multisystem injuries which assisted 1000 victims in the medical institutions of the second level and 150 victims in the third level institutions. We studied the necessity for the assistance in the diagnosis, recommendations for treatment, and dynamic control. We explored the effectiveness of telemedicine on the example of 110 patients.
Results: The use of telemedicine technology in the process of care in patients with polytrauma is appropriate in medical institutions of the second level. There is a difference between the need and feasibility of telemedicine technology in institutions of the 2nd and the 3rd levels with the second level there is a need for treatment guidelines. The use of telemedicine technology can increase the survival of the affected by 14.5% by optimizing the provision of emergency medical care.
Conclusions: Conditions of Ukraine's health care system, do not allow providing full medical and diagnostic care in all medical institutions of Ukraine. Therefore, there is request to continue consulting practitioners in damage control specialty, dynamics of treatment, as well as providing opportunities to discuss and select the optimal therapeutic and diagnostic management.
Key words: telemedicine, multiple traumas, victims.

Introduction

World experience of care to trauma victims demonstrates the high efficiency of the methods of telemedicine in the organization of care to trauma victims, and effective and adequate implementation of therapeutic and diagnostic activities [1].

The actual conditions of the health system of Ukraine do not allow a full medical diagnostic aid in all medical institutions of Ukraine [2, 3].

There is therefore a need for constant consultation practitioners majoring in damage control dynamics of treatment, as well as providing opportunities to discuss and select the optimal therapeutic and diagnostic activities [4].

The increase in the number of severity and types of injuries leads to the necessity of highly skilled, highly specialized and high-tech medical care for patients with polytrauma.

World experience in providing medical care to victims of trauma indicates high efficiency of telemedicine methods in the organization of medical care to victims of trauma and effective and adequate implementation of therapeutic and diagnostic measures.

In fact, the current situation of the health system of Ukraine does not allow for a full medical and diagnostic care in all medical institutions of Ukraine [5]. Therefore, there is a need for constant counseling practitioners with specialty in damage control dynamics of treatment and who enable discussion and selection of optimal therapeutic and diagnostic measures. The above is only possible when using telemedicine techniques, which ensure interoperability of health care institutions at various levels.

Material and methods

We made some analyses of the necessity of the telemedicine consultation and control in 1150 patients with multisystem injuries which assisted 1000 victims in the medical institutions of the second level and 150 victims in the third level institutions. We studied the necessity for the assistance in the diagnosis, recommendations for treatment, and dynamic control. We explored the effectiveness of telemedicine on the example of 110 patients.

All calculations were conducted according to the criteria and requirements of evidence-based medicine by using computer technology, with all provisions and findings being within probabilities.

Results and discussion

The study found that the advice actually require 82% of the victims who were given medical treatment in medical institutions of the second level, and 36% of victims who received assistance in the third level institutions (tab. 1).

Table 1

The victims who were given medical treatment

Events	The share in the array of needs (%)	The share of the total array (%)	Rank
Help in diagnosis	52,56	45,10	1
Recommendations for treatment	35,24	25,13	2
Dynamic control treatment	19,02	10,78	3

Advisory services to provide recommendations on treatment of victims are needed at the second level and it is near 35.24%. Additional help for the dynamic control is 19.02% or 10.78% of the total array and is ranked on the third place. Thus, it should be noted that the main problem can be solved by consultation with highly qualified specialists in the field of injury problems. Recommendations for treatment take 1.5 times less, when this technology is used and in a dynamic control 2.7 times less. Expert analysis of cases showed, that the vast majority of aid could be accelerated and provided by using telemedicine technology.

Analysis of the data presented in table 2 indicates that the vast majority of consultative and diagnostic assistance could be provided via telemedicine technology. While studying the need for advisory assistance in the third level institutions we found that this was required only by 20.06%. The distribution of aid is given in table 3.

As seen from table 3, the structure needs to conduct additional measures. Level 3 is different from the establishments of the 2nd level. Firstly, only 20.06% need additional advice, secondly, first is the need for consultative assistance for the treatment of victims who make up 90.32% or 18.67% of the array.

Diagnostic measures constitute only 35.48% of the array needs or 7.33% of the array.

Almost 19.35% of the panel needs dynamic control of the treatment, or 4% of the array.

Telemedicine techniques can be applied to a limited extent. As shows the data from the table 4, the use of telemedicine technology as a method to perform additional advice is only for 20% of diseases. The most necessary substitution is in the

Table 2

Consultative and diagnostic assistance that could be provided via telemedicine technology

Events	Need		Expert possibility for such measures		The possibility of using telemedicine	Rank
Diagnostic	52,56	45,10	37,80	31,06	68,74	2
Treatment	35,24	28,90	26,10	21,40	74,05	1
Dynamic observation	19,02	15,60	15,12	12,40	65,19	3

Table 3

The need for advisory assistance in the third level institutions

Events	The share in the array of needs (%)	The share of the total array (%)	Rank
Help in diagnosis	35,48	7,33	2
Recommendations for treatment	90,32	18,67	1
Dynamic control treatment	19,35	4.00	3

Table 4

Comparative characteristics of the use of telemedicine technology in diagnosis and treatment

Events	Need		Experts taking action		The possibility of using telemedicine	Rank
	The needs	Gen.	The needs	Gen.		
Diagnostic	35,48	7,33	12,9	2,67	36,36	1
Treatment	90,32	18,67	12,9	2,67	14,29	2
Dynamic observation	19,39	4,00	16,66 0,322	0,6	16,67	3

diagnosis of injuries. The therapeutic assistance was needed in half of cases. Therefore, there is a real need for consultant call in the third level structures. Analysis indicates that the use of telemedicine technology is most appropriate in health care institutions of the second level.

The use of telemedicine technology to provide health care, organization and implementation of therapeutic and diagnostic measures in 110 patients with polytrauma, who was given medical care in the second level institutions, has proven that expert estimated figures are fully confirmed. The use of telemedicine technology enhanced the survival of victims by 14.55% due to the improvement of the quality of diagnosis, optimization of the characteristics of therapeutic techniques, reduction of clinical decision-organizational solutions for conducting Clinical Diagnostic measures.

Conclusions

1. The use of telemedicine technology in the process of care in patients with polytrauma is appropriate in medical institutions of the second level.

2. There is a difference between the need and feasibility of telemedicine technology in institutions of the 2-nd level, and the 3-rd level. There is a need for a correction and guidelines of the treatment and diagnostics principles at the third and the second levels.

3. The use of telemedicine technology can increase the survival of affected by 14.5% by optimizing the provision of emergency medical care.

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