Telemonitoring in patients with anticoagulant treatment in a public health service in Chile

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Abstract

Anticoagulant therapy has been the choice per excellence to avoid the risk of thromboembolic events in a number of pathologies and procedures. The therapeutic range of rationalized as prothrombin time (INR, or International Normalized Ratio), which compares synthesis clotting time before and after the use of anticoagulants. International and own evidence Telemonitoring Company in Chile demonstrating that the clinical virtual service is a model of continuity of care that contributes to the control of patients with different pathologies.This article describes a monitoring program for patients on anticoagulant treatment at a public health service in Chile.

Keywords: *Telemedicine; Lupus Coagulation Inhibitor; Public Health.*

Resumen

Telemonitoreo en pacientes con tratamiento anticoagulante en un servicio de salud público en Chile
El tratamiento anticoagulante ha sido la opción por excelencia para evitar riesgos de fenómenos tromboembólicos en una serie de patologías y procedimientos. El rango terapéutico de la medida racionalizada del tiempo de protrombina (INR o International Normalized Ratio), que en síntesis compara el tiempo de coagulación antes y después del uso de anticoagulantes. La evidencia internacional y también propia de la Empresa de Telemonitoreo en Chile que demuestra que el servicio clínico virtual representa un modelo de continuidad del cuidado que contribuye en el control de los pacientes portadores de diferentes patologías. Este artículo describe um programa de telemonitoreo en pacientes con tratamiento anticoagulante en uno servicio de salud publico en Chile.

Palabras-clave: *Telemedicina; Inhibidor de Coagulación del Lupus; Salud Pública*

Resumo

Telemonitoramento de pacientes em tratamento anticoagulante em um serviço público de saúde no Chile
O tratamento anticoagulante tem sido considerado a primeira opção por excelencia para evitar riscos de fenómenos tromboembólicos em uma série de doenças e procedimentos. O intervalo terapêutico de forma racionalizada é controlado pelo tempo de protrombina (TP), que compara tempo de síntese de coagulação antes e depois do uso de anticoagulantes. Evidência internacional e também a própria experiencia do serviço de telemonitorização no Chile demonstra que a assistência virtual clínica é um modelo de continuidade dos cuidados que contribui para o controle de pacientes com diferentes patologias. Este artigo descreve um programa de seguimento de pacientes em tratamento anticoagulante em um serviço de saúde pública no Chile.

Palavras-chave: *Telemedicina; Inibidor de Coagulação do Lúpus; Saúde Pública.*

INTRODUCTION

The anticoagulant treatment has been the choice per excellence to avoid the risk of thromboembolic events in a number of pathologies and procedures. The bibliography is extensive in this area, also regarding the therapeutic range of rationalisation measure as Prothrombin time (INR or International Normalized Ratio), which in short compares the clotting time before and after the use of anticoagulants.

On the other hand, you can understand that knowing that the reduction of the risk of a thromboembolic complication depends on the maintenance of a INR number in the therapeutic range in treated patients, that this level is reached and remains stable is essential. Therefore, the goal of achieving this is the key and for this reason the studies today, not only point to the pharmacological aspects of this treatment, but the accompanying measures of the equipments to the patients, to promote as indicated by different authors, the patient adherence, and their self-control and also the information and the use of information technology. (Health Research Institute Jimenez Diaz Foundation Autonomous University of Madrid, Economic Impact of anticoagulant treatment with antagonists of vitamin K in patients with metallic valve prosthesis in the mitral position.[1-9]

In another domain, it is numerous the international evidence and also the Company Telemonitoring itself in Chile that demonstrates that the Virtual Clinical Service is a model of continuity of care that contributes in the control of patients with different pathologies. Many studies show that the advantages of this system are: ubiquitous, proactive, focused on prevention and develops the patients' autonomy.[10,11] However, the telemonitoring and / or teletracking in the anticoagulant treatment, up to here, do not show sufficient studies what led to the decision to carry out this work.

In this context, it was decided by AccuHealth, in conjunction with the Health Service of the metropolitan region, to promote the early discharge of patients that started anticoagulant therapy for different diseases and perform a protocol for remote monitoring with control of clotting time and INR daily calculation.

METHOD

This is a follow-up observational study of 182 non-randomised patients under anticoagulation therapy, with different pathologies of origin, which were followed under control of INR and other symptoms and signs at a distance, according to a daily protocol and emergency when presented a symptom or defined sign in the alarm or alert protocols. The study was conducted between 2014 and 2015.

The Protocol set monitoring deadlines, which were considered according to the INR achievement in therapeutic range.

The objectives of the program are:
- improve the adherence to indications and treatment of patients in anticoagulant therapy who care for services at the health service, thanks to the Telemonitoring System;
- improve clinical, economic and social aspects associated with the treatment of these same patients.

Program implementation

It is created care protocols and referral to secondary care patients, where it is established:
- intervention parameters according to the INR, loss of controls or subjective evaluation of the patient;
- frequencies of differing control for this group, agreed with clinical teams of the center, as indicated in the respective Appendix.

Inclusion criteria

- discharged patients with anticoagulant therapy, all under control in the SSMSO;
- patients who voluntarily agree to participate in the program;
- autonomous patients or dependents on support network.

Exclusion criteria

- patients whose homes do not have electricity and cell phone coverage.
- patients with terminal concomitant diseases.
- patients with uncompensated psychiatric pathologies.
- voluntarily patients who do not wish to undergo this type of intervention

Under these conditions, the telemonitoring program to patients began on January 17th 2014 and the cut-off date for this report was January 1st 2015.

It was given to all patients a TV monitor and a coagulometer that relate themselves via Bluetooth. The patients

were induced and trained in handling equipments and protocols. The monitor, each time it is performed a protocol develops an intelligent questionnaire in order to know the subjective aspects of the patients.

The patients had to sign a record of equipment delivery and an informed consent, as well as provide the medical history necessary for a proper control.

The data analysis was performed using frequency measurements for the characterization of the patients and according to the results of the INR, due to reach the optimal range, the sub and about the optimal and it correlates with the number of days of follow-up. It was also analised the patients who had bleeding of various types.

In addition, it was conducted an assessment of patients' satisfaction through self-administered surveys, with a Likert scale, which considered the opinion on the quality of the equipments and the technology, the routine controls, the communication with the professional teams of accompaniment and the appreciation of the company at a distance.

RESULTS

The patients who finally were enrolled and monitored for this study were 182. In total there were 188 patients monitored, of which three did not enter by their own choice, one of them died, the other was removed due to present terminally illness and another was re-hospitalized. All of them discharged from Sotero del Rio Hospital.

These patients had the following characteristics:

First of all, it can be seen that most of them are women (58.8%) and 41.2% are men. In relation to the age, 75.8% are between 45 and 79 years old.

As expected, the main diagnosis corresponds to different types of thrombotic events that reaches 61.5%, followed by various types of heart disorders, which in turn reaches 13.4%.

Regarding the communications with these patients, it was performed 798 calls during this period, divided into: 718 calls from Accuhealth company and 80 patients' calls to Accuhealth company. Thus, the result is 4.38 (798/182) calls per patient.

The clinical results can be seen in Table 1-3 and Figure 1. The INR average of entry. As can be seen, the INR entry rises by 0.36 days and the average days of follow-up was 10.89.

In Figure 1, it is possible to observe how the frequency of patients changes in the range of 2 and 3.5 of INR, from 40-98%.

Table 1 - Patients classified by age groups

Age	Number of patients (percentage)
Younger than 25	1 (0.5%)
Between 25 and 44	20 (11%)
Between 45 and 64	76 (41.8%)
Between 65 and 79	62 (34.1%)
Older than 80	23 (12.6%)
GENERAL TOTAL	182 (100%)

Table 2 - Patients according to diagnosis of origin

Diagnosis	Cases (porcentage)
Thrombosis	112 (61.6%)
Cardiopathology	28 (15.4%)
Infeccions	19 (10.4%)
Others (Diverses)	23 (12.6%)
TOTAL	182 (100%)

Table 3 - Average of INR Inflow and Outflow of patients with TACO. Average of follow-up days

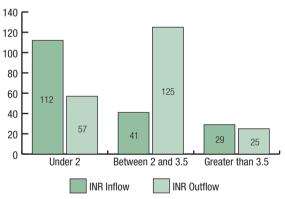| Average of INR Inflow	Average of INR Outflow	Average of follow-up days
2.23	2.59	10.86

Figure 1 - Frequencies of INR under 2, between 2 and 3.5 and 3.5.

Finally, measured the complications, there were 26 episodes of bleeding on 19 patients, which consisted mainly of bruises. Only 10% of patients presented certain complication (Table 4).

Table 4 - Complications of bleeding

	Kind of Bleeding		
Revised bleeding	Younger	Older	Bruise
26	9	2	15

On the other hand, the results of satisfaction surveys performed were collected on areas of: equipments and technology, routine activities, communications and appreciations. Results that correspond to whom answered the survey are 58.9% of the total of patients. The results show that the evaluations are very positive, as can be seen in Table 5, except the handling of the equipment, which apparently proved to be difficult to operate.

Table 5 - Results of satisfaction surveys

Equipment and technologies
■ 24.1% of patients strongly agree and agree that cost them little learning to use computers;   ■ 26.9% of patients strongly agree and agree that the devices and / or equipment are easy to manipulate;   ■ 29% of patients strongly agree and agree that data transmission is simple.
About routine activities
■ 93.5% of patients considered that the amount of daily checks was enough to keep your blood sugar controlled;   ■ 99.1% of patients report that they strongly agreed, that the survey questions were easy to answer;   ■ 83.2% of patients strongly agree and agree that the calls were clear;   ■ 74.5% of patients strongly agree and agree that the information provided by professionals, helped them to learn about their disease.
About communications
■ 100% of patients prefer to be strongly agree and agree, personnel AccuHealth gives an image of trust and honesty;   ■ 96.3% of patients strongly agree and agree that AccuHealth team answers your questions;   ■ 100% of patients strongly agree and agree that I felt closer to the technical team of the establishment where I attend me regularly.
Appreciations
■ 98.1% of patients strongly agree and agree that the system helped him;   ■ 99.1% of patients strongly agree and agree that he was accompanied during the TLM;   ■ 100% said they strongly agreed and agreed he was more committed to your health.   ■ 90.7% of patients strongly agree and agree that the TLM helped him, for the family to understand the pathology;   ■ 100% recommend the TLM.

The most surprising results in this area are the spontaneous comments delivered by the patients after answering and that confirm 100% of the findings of feeling accompanied with the system.

CONCLUSIONS

The increasing of chronic problems and the demand for care associated with the expansion of life expectancy, the increased cost of health benefits and the explosive development of information technologies are determining that health requires new forms of management.

The traditional system of health care is on-site, reactive, with passive patients, focused on curing, fragmented, data generator and fundamentally dependent and the system with telemonitoring is ubiquitous, proactive, because it requires informed active patients, focused on the prevention, connected and integrated, more intelligent and above all tends to autonomy.

The SMRP shows itself highly efficient and effective in the management of patients with early discharge in anticoagulant treatment, the results obtained are highly encouraging, as for achieving the results of INR in the therapeutic range, the number of complications, as for the satisfaction manifested by the user.

This system, in this particular case, has an additional value, as it has allowed a "protected" early discharge by the telemonitoring system and thus be alert to complications and prevent risks. Similarly, the remote monitoring avoids unnecessary travel care services. Thus, the SMRP, has an impact opportunity cost to use medical consultations and emergency visits to other patients, allowing a more efficient use of these resources. Certainly, this area requires further studies.

FINAL CONSIDERATIONS

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