Strategies for safety and quality improvement of oral anticoagulant therapy
The experience of a general Hospital in Tradate-Italy

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The author doctor Cristina Gualtierotti and her purebred spanish stallion Chinchon

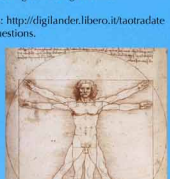
Brief outline of context:
In Tradate Hospital ,a general hospital of 170 beds, the Cardiology Unity run Anticoagulation Clinic of 600 patients referred by in and out hospital physicians for all the indications of anticoagulation.

Brief outline of problem:
We assess the impact of multiple strategies implementation for improving quality and safety of oral anticoagulation therapy (OAT) through a reduction of INR instability.

Assessment of problem and analysis of its causes:
INR instability cause major OAT complications: 2,4% 100 pt/year major hemorrhages, 0,46% cerebral hemorrhages, 2-3% ischemic stroke, 0,1-1% cutaneous necrosis-

Strategy for change
ENROLLMENT
4 dedicated cardiologists enrol pts for OAT risk/benefit evaluation according to CHAD score, risk of cerebral hemorrhage, feasibility , compliance and detailed education.
SOFTWARE: PROMETEO by Siemens Healthcare Diagnostics- Milano-Italia
INDUCTION of THERAPY
Therapy begins with warfarin 4 mg and INR is checked biweekly in the first week, every four days in the second week, and weekly for 15 days, if INR in range and after according to INR values.
MAINTANANCE THERAPY
For **INR > 4** warfarin withdrawal for two days and INR the third day for thromboembolic low and moderate risk patients ,and withdrawal for one day, half dose of usual daily dose the second day, INR third day for high thromboembolic risk patients.
For **INR > 5** K vitamine according to 2004 ACCP guidelines.
For **INR <1,9** prophylactic dose of low molecular weight heparin (4000 U/l enoxaparin) for two days and increasing daily dose not more than one forth of usual dose for two days
For **INR < 1,5** prophylactic dose of low molecular weight heparin for two days and increasing daily dose of fifty percent of usual dose for two days
Instable INR: direct and prompt pt contact for evaluation of instability causes (diet, drugs, herbs, sepsis, new illness) reviewing clinical anamnesis.
Multivitaminic supplement twice a week with a low dose of K vitamin, mcg 30, for pts with sporadic INR > 4 without a clear reason.
OAT interrupting schedule for **invasive procedures** according to FCSA guidelines
Fax sending doses for patients in holidays
Realization of an Internet site for pts, doctors and nurses: http://digilander.libero.it/taotradate
Nurses training to answer the most frequently asked questions.

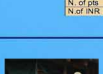
Measurement of improvement
We have compared the period from 2001 to 2003 when the Anticoagulation clinic was run by non dedicated physicians and the period from 2005 to 2007 when four dedicated cardiologists and three dedicated nurses have implemented the above strategies. We have not considered 2004 year because it took that period to perfectionate and apply all the strategies. We have measured the time in range index in the two different periods to assess the quality of our INR stability and we found a significant difference (p<0,002) with an improvement from 58,1% to 67,8%.



Effects of change

	2007	2006	2005	2003	2002	2001
Time in range	66,72%	68,89%	67,84%	57,56%	58,13%	58,87%
N. of pts	556	600	604	453	363	263
N.of INR	8707	8812	9281	6988	5042	2754

THE WARFARIN STORY



In 1933 the University of Wisconsin discovered that dreadful and long unexplained death of cows for internal and external hemorrhages was caused by moist sweet clover hay. Rainy season had allowed mold in the sweet clover to convert in coumarin compound which prevented blood clotting. This compound for many years was used to prepare a poison for mice.
Coumadin in humans was used for the first time in 1953 when President D.D. Eisenhower had a heart attack and the drug was used to prevent clots from forming in his damaged heart.
That was the beginning of the transformation of Coumadin from poison to drug.....a difficult drug to manage....too much can kill...too small a dose does not prevent thrombosis.
The narrow therapeutic index of the drug explains the importance of helping patients dosing Coumadin.

Lessons learnt
Our experience has taught us that OAT must be tailored on the single patient and even in the same patient ,anticoagulant dosing can change in different periods and is paramount to be in strict and friendly contact with patients for understanding all different mechanisms of INR instability.

MESSAGE FOR OTHERS
A quality OAT needs a optimal collaboration between physicians, patients, , nurses, laboratory to help patients to comply with oral anticoagulants which often are under used for their difficult management.
Physicians dedicated to OAT must be updated on guidelines and rare interactions and complications of anticoagulant drugs and adhere to a common way of OAT management.

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