A REVIEW ARTICLE ON VARIOUS STRATEGIES FOR PATIENT EDUCATION ABOUT ANTICOAGULANT THERAPY WITH WARFARIN

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ABSTRACT:
Patient education is an important component in quality management of the anticoagulated patient. Because it is time consuming for clinicians. Education of the anticoagulated patient is often neglected. I searched the medical literatures in order to identify the best patient education strategies.

Key words: Anticoagulants, patient education, anticoagulated patient.

INTRODUCTION:
1. Anticoagulants are widely used to prevent and treat thromboembolic events, but are also high-risk medication.
2. They are associated with increased risk of bleeding and are one of the top drugs causing emergency hospitalization.
3. Taking anticoagulants incorrectly (i.e non-adherence) can increase risk of bleeding or thromboembolic events. Drug interaction, and in case of warfarin, dietary interactions also increase the risk of anticoagulants-related adverse events.
4. Furthermore, Warfarin is a narrow therapeutic index medication and requires regular blood test optimal anticoagulant effect.
5. Thus, it is imperative that patients receive extensive high-quality patient education while taking anticoagulation therapy.
METHODOLOGY:

STUDY SELECTION:

We searched the MEDLINE and google scholar databases using the words “Warfarin” or “anticoagulation”, and “patient education”. We initially identified 158 citations. A total of 114 citations were excluded because patients were of pediatric age (4), the article was not related to patient education (25), did not contain original data or inadequate program description (52), was focused solely on patient self-testing (2), was a duplicate citation (3), the article was judged otherwise irrelevant (12), or no abstract was available (16).

After exclusion, a total of 44 articles were selected for further review. Upon further review, an additional 11 articles were excluded because of inadequate description, finally leaving a total of 33 articles for data extraction. I extracted data on clinical setting, study design, group size, content source, time and personnel involved; and created summary tables.

RESULTS:

14 articles had a description of the research methods or program that was adequate and consistent with objectives of identifying the duration, timing program and personnel requirements of the educational program. Five programs used a nurse or pharmacist, four used a physician, and two studies used personnel (lay educators 1, videotapes 1). The duration of the educational intervention ranges from 1-10 sessions. Patient group size most often averaged 3-5 patients but ranged from as low as 1 patient to as much as 11.
patients. While the majority of the educational effects occurred in inpatient setting, most seemed relevant to contemporary outpatient setting.

Although 13 articles offered information about education content, I summarized the categories suggested by these studies and listed the potential topics for each category.

### Patient education strategies related to warfarin and anticoagulation

<table>
<thead>
<tr>
<th>Citation</th>
<th>Study Design</th>
<th>Stated Goal</th>
<th>Group Size</th>
<th>Personnel Involved</th>
<th>Strategy/Duration/Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Menendez-Jandula et al. 2005 Barcelona, Spain RCT</td>
<td>To prove the value of self-management on INR control and clinical outcomes</td>
<td>5–8 patients and option of having family member present</td>
<td>Specially trained nurse</td>
<td>2 sessions of 2 hours on consecutive days Based on German model</td>
<td></td>
</tr>
<tr>
<td>Koertke et al. 2009 Westphalia, Germany Program description</td>
<td>To describe the principles of a training course to learn INR self-management</td>
<td>Not more than 5 patients</td>
<td>Not stated</td>
<td>Welcome period Two phase (hospital, 6 months later) Average duration 3–4 hours (1.5 for theoretical and 1.5 for device handling)</td>
<td></td>
</tr>
<tr>
<td>Valler et al. 2009 Westphalia, Germany Program description</td>
<td>To evaluate the effects of a training program on patient knowledge</td>
<td>2–5 patients</td>
<td>Not stated</td>
<td>Two half day sessions 2–7 days apart Patient logbook</td>
<td></td>
</tr>
<tr>
<td>Khan et al. 2004 Newcastle, U.K. RCT</td>
<td>To prove the value of education and self-monitoring on INR control and quality of life</td>
<td>2–3 patients</td>
<td>Led by physician</td>
<td>1 two hour educational session</td>
<td></td>
</tr>
<tr>
<td>Goddard et al. 2003 Leiden, Netherlands RCT</td>
<td>To examine effects of self-management on quality of life</td>
<td>4–5 patients</td>
<td>Specialized teams of physicians and nurses</td>
<td>3 weekly sessions of 90–120 minutes</td>
<td></td>
</tr>
<tr>
<td>Single et al. 2003 Philadelphia, U.S. Cohort Survey</td>
<td>To examine effects of group education on knowledge</td>
<td>11 persons</td>
<td>Pharmacist or nurse</td>
<td>1 one hour session</td>
<td></td>
</tr>
</tbody>
</table>

### Studies testing patient knowledge regarding anticoagulation

<table>
<thead>
<tr>
<th>Citation</th>
<th>Setting/Study population</th>
<th>Questions—Number and Type</th>
<th>Administration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hu et al. 2006</td>
<td>Large urban teaching hospital 100 mechanical valve patients</td>
<td>20, True-False</td>
<td>Scripted telephone survey Trained medical student</td>
</tr>
<tr>
<td>Zolla et al. 2006 OAK test</td>
<td>U.S. Recruited from 4 pharmacies and 2 clinics 122 volunteers</td>
<td>20, Multiple choice, Validity and reliability testing</td>
<td>Self administered Excluded illiterate patients 7th grade reading level</td>
</tr>
<tr>
<td>Roche-Nagie, Chambers 2006</td>
<td>Dublin teaching hospital anticoagulation clinic 150 consecutive patients</td>
<td>8, Specific answers</td>
<td>Standardized interview</td>
</tr>
<tr>
<td>Davis et al. 2005</td>
<td>Two NYC anticoagulation clinics 52 patients</td>
<td>18, Multiple choice</td>
<td>Self administered Single visit Excluded low literacy patients</td>
</tr>
<tr>
<td>Briggs et al. 2005 AKA test</td>
<td>Two Chicago inner city, pharmacist-managed anticoagulation clinics 69 patients</td>
<td>20, Multiple choices, Validity and reliability testing</td>
<td>Self administered Excluded illiterate patients 7th grade reading level</td>
</tr>
<tr>
<td>Valler et al. 2004</td>
<td>Three German 2 teaching centers 76 patients</td>
<td>13, Multiple choice</td>
<td>Questions not available</td>
</tr>
<tr>
<td>Nadler et al. 2003</td>
<td>3 U.K. teaching hospital anticoagulation clinics 180 patients who attended the clinic &gt; 5 times</td>
<td>9, Short answer</td>
<td>Language concordance, personal interview</td>
</tr>
</tbody>
</table>
## Topics for education of the anticoagulated patient

<table>
<thead>
<tr>
<th>Category</th>
<th>Educational topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basics of anticoagulation</td>
<td>Description of the coagulation system. Normal blood clotting compared with clotting of an anticoagulated patient. Warfarin mechanism.</td>
</tr>
<tr>
<td>Risk-benefit</td>
<td>Risk of bleeding versus descriptive versus numerical complications of thromboembolic.</td>
</tr>
<tr>
<td>Adherence</td>
<td>Colour and strength of tablets. What to do if dose missed.</td>
</tr>
<tr>
<td>Accessing healthcare professionals</td>
<td>When to call the doctor. When to seek emergency care. Anticoagulation services.</td>
</tr>
<tr>
<td>Diet</td>
<td>Basic of vitamin K. Specific foods.</td>
</tr>
</tbody>
</table>

### TAKING ANTICOAGULATION MEDICATION SAFELY

Before giving warfarin prescription, doctor and nurse be aware of following:

- All the medications, herbal supplements, and vitamins are currently taking should keep an updated list with the patient at all times.
- Any allergies or bad reaction that the patient had with food or medications in the past.
- The patient health and illness history, especially if patient had any problems with bleeding in the past.

### BEFORE STARTING WARFARIN MEDICATION:

- The patient should ask the doctor the following questions:
  - How will this medication help me?
  - What side effects should I expect and what should I do about them?
  - How and when do I take this medication?
  - How long I should use this medication?

Inform the doctor if pregnant or if planning for pregnancy.
WHY THE PATIENTS NEED TO HAVE BLOOD TESTS DONE:

The amount of warfarin to each person is different. In order to find the best dose of warfarin for the patient, a blood test called INR (international normalized ratio) will be done. The INR measures how long it takes for blood to clot.

The goal of warfarin therapy is to keep the INR within a certain target range, as determined by the doctor. If the INR is too high, then the patient is at higher risk for bleeding problems. If it is too low, then the patient may be at risk for developing blood clots.

When the patient first start taking warfarin, expect to have the blood checks as dosage.

Once INR is in the prescribed target range then dose of warfarin will become more regular and the blood testing will be done less often.

WHILE THE PATIENTS ARE TAKING THIS MEDICATION

Be sure to keep track of:

- INR blood test results
- The dose of medication taken each day
- The date of next INR blood test
- Any problems or side effects that patient experience
- Any other instructions or other information from the doctor or nurse

HOW TO TAKE ANTICOAGULATION MEDICATION

Take the anticoagulation at the same time every day, as directed by the doctor or nurse. This is important because it makes the medication work more effectively. If the dose is miss or skip, contact the doctor or clinic. DO NOT take a double dose.

Based on the INR, you may have to change the dose of warfarin frequently, especially when taking of medication starts. The required dose of warfarin varies greatly among patients. Patients needing a higher dose of warfarin are not at greater risk of side effects than those requiring lower doses.

IMPORTANT PRECAUTIONS WHILE TAKING ANTICOAGULATION MEDICATION

- Stay safe while taking medication
- Be careful when using objects (such as sharp objects) that can cause injury or bleeding
- Call the doctor or go to the hospital immediately if patient have any cuts or injuries that will not stop bleeding even after applying constant pressure

Call the doctor or the clinic when;
While start of taking new medication or stop taking
Any major diet changes or before starting any kind of weight loss plan
If patient have any questions about the medications or blood testing
Go for blood tests as instructed

SIDE EFFECTS

The most common side effects are slight visible bleeding, sometimes may notice;

- A small amount of bleeding from gums while brushing the teeth
- Occasional nosebleeds, especially in winter when the air is dry
- Easy brushing
- Bleeding after a minor cut that stops within a few minutes
- Menstrual bleeding that is a little heavier than normal

HOW TO PREVENT SIDE EFFECTS

- Use a soft toothbrush
- If sensitive to dry air, use a humidifier in the winter
- Avoid contact sports or activities in which injuries are common
- Eat a regular and nutritious diet and discuss any planned diet changes with the doctor or nurse

IF THE PATIENT HAS MINOR CUT OR BRUISE

Treat the injury with basic first aid. If significant bleeding continues for longer than 10 minutes despite applying pressure, call the doctor or go to a hospital emergency room.

CONDITIONS THAT REQUIRE IMMEDIATE MEDICAL ATTENTION

- Large amounts of noticeable bleeding
- Red, dark, coffee, or cola coloured urine
- Bowel movements that are red or look like tar
- Bleeding for the gums or nose that does not stop quickly, within 10 minutes
- Vomit that is coffee coloured or bright red
- Anything red in colour that the patient coughed
- A cut that will not stop bleeding within 10 minutes
- A serious fall or hit on head
- Any unexplained dizziness or weakness
GOING TO THE DENTIST

Before going to doctor inform about intake of warfarin. the doctor may ask about most recent INR results or may request about blood test reports before the appointment.

Usually the dental treatment can go ahead as normal without any anticoagulants dose being stopped or the dose being adjusted.

DIET PLAN

Vitamin K affects the way that blood clots form. It is found in ,any foods and it can affect the INR results.it is important to eat a healthy and balanced diet. All of these foods are healthy, but eating them in large amounts may lower the INR results. There is no right or wrong amount of vitamin K that one should take. It is more important to take in the same amount each day. That way, the INR results will stay consistent.

FOODS RICH IN VITAMIN K

- Green leafy vegetables (kale, spinach, green leaf or romaine lettuce)
- Parsley
- Asparagus
- Broccoli
- Coleslaw
- Brussels sprouts.

THE FOODS SHOULD TAKE, BUT IN SMALL QUANTITY

- Flaxseeds
- Garlic
- Cranberry juice
- Mango
- Ginger
- Green tea
- Avocado
- Soy (soy milk, tofu)
- Avoid natto (fermented soy), grapefruit, Seville oranges, tangelos and their juices

ABOUT ALCOHOL

Alcohol can affect the anticoagulant dose. Keep the alcohol intake at two drinks or less per day. Avoid binge drinking. It will affect the INR and can result in other serious problems.

NEW ORAL ANTICOAGULATION MEDICATIONS

Currently three new oral anticoagulant medication available in Canada. These are DABIGATRAN (also called Pradaxa) RIVAROXABAN (also called Xarelto) APIXABAN (also called Eliquis)

- These new medications CANNOT be taken by patients with severe heart valve problems, artificial heart valves, or sever kidney disease
- Blood test should be done to check the kidney functions
- These new medications do not need INR blood work monitoring or dose changes
Conclusion:
Patient education is entering a new era where the accountability in educational outcomes, interest in literacy, and the process of patient education is influenced by cost. Step necessary in improving anticoagulation outcomes is prioritizing educational content and using validate instruments.

Reference:


38. Health Literacy in Pharmacy. Agency for Healthcare Research and Quality; Rockville, MD, USA:


42. Anticoagulation Toolkit: Reducing Adverse Drug Events & Potential Adverse Drug Events with Unfractionated Heparin, Low Molecular Weight Heparins and Warfarin.
