PATIENT EMPOWERMENT AND INSULIN TITRATION

Introduction: Empowering patients to self-titrate

What is patient empowerment in insulin titration all about?
We know that physicians and doctors are afraid of insulin titration because of the risk of hypoglycaemia, so what are we expecting from our patients? Are we playing with fire and will the result be increased hypoglycaemia?
The truth is that the burden of type 2 diabetes is so large that we will have to empower patients to control their own disease processes.

This presentation concentrates on a few issues:
• What is self-management?
• What is the role of communication in empowering patients?
• Lastly, it presents a simple tool that will help patients to adjust their insulin dosage themselves and which can be used by clinicians in their everyday clinical practice.

KEY MESSAGES
• Structured education is one of the most important contributors to effective self-management; however, it is not available everywhere
• Self-management and insulin titration require patient education and empowerment
• Good physician/patient communication is key for patients to be able to take control of managing their insulin regimen
• Trials of insulin self-titration have demonstrated that it is a suitable alternative to physician titration in some patients.

What is self-management?
It is important to realise that a person with type 2 diabetes will carry that diagnosis and disease burden for the rest of their life. This represents many years for most people and 99.98% of that time will be spent away from hospitals and clinics. Therefore, most of the time patients will need to be responsible for their own disease. “These patients have to take ownership of their diabetes,” Dr Wu stressed.
Self-management is not easy and has many aspects. The major components of effective self-management are illustrated in Figure 1.

Figure 1. What is self-management?

Self-management involves the person with this chronic condition

This article was made possible by an unrestricted educational grant from Novo Nordisk, which had no control over content.
Communication and support

Communication is key to the development of a patient’s self-management skills. The key when starting insulin is patient access to diabetes nurse educators. This is increasingly being recognised worldwide. “In this South African audience, 80% of clinicians have indicated they have some access to diabetes nurse educators; 44% have said that they always have access.” This is really important because structured group or individual education is one of the most important contributors to effective insulin self-management, as it provides specific aims and learning objectives for people with diabetes, their carers and their families. A real barrier is that this service is not always available and the education task then falls to the clinician.

This highlights the importance of having a simple tool to help the clinician and the patient titrate insulin effectively.

Knowledge alone does not guarantee lifestyle change; there needs to be a clear understanding of why behaviour modification is necessary. Clinicians often overestimate patients’ understanding of their treatment regimen. In one study, 50% of patients did not understand common medical terms. In another evaluation of doctors’ communication, in cases where doctors tried to introduce more than one new concept during a consultation, there was a lower rate of success in engaging the patient. “There is a need to keep the message simple and succinct,” Dr Wu observed.

How you convey information matters

Good physician/patient communication is important to help give your patients the self-confidence to take control of the management of their insulin regimen. It is important not to send ‘mixed messages’ as the clinician cannot then be sure that the most important message was received. “The way we communicate to both our patients and fellow healthcare workers is very important. Messages must be clear, concise and to the point.”

Evidence that self-titration of insulin can be effective

How do we approach this topic so patients can act effectively and safely? Is there evidence that self-titration works?

It is important to stress that self-titration of insulin is a vital first step in the self-management process. The person who is best placed to titrate insulin is clearly the patient himself (Table 1).

Clinicians should realise that while education about titration may be perceived as a waste of time, effective self-titration by the patient actually saves time and trials have shown significant results with this approach. One of the best trials in this field is the Rotterdam Study. One hundred and forty-nine patients received diabetes educator assistance via telephone on how to self-titrate a premixed insulin (BIAsp 30 – 30% soluble, rapid-acting insulin aspart and 70% protamine-bound protamine).

<table>
<thead>
<tr>
<th>Table 1. Self-management of insulin titration</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Self-titration of insulin is an important step in the self-management process</td>
</tr>
<tr>
<td>• Patients who are able to initiate and intensify insulin with limited contact with healthcare professionals place less of a financial and time burden on healthcare systems</td>
</tr>
<tr>
<td>• Trials of insulin self-titration have demonstrated that it is a suitable alternative to physician titration in some patients</td>
</tr>
<tr>
<td>• Patients should be selected for self-titration (some patients will not be suitable)</td>
</tr>
</tbody>
</table>

Insulin aspart) using a titration tool. Patients were admitted to the study if their glucose control was slipping on either oral medication or another form of insulin and they were then put on twice-daily biphasic insulin. There were no doctors involved in the titration of the insulin and patients used the titration tool, supported only by telephonic advice. What were the results? Figure 2 shows achieved HbA1c levels in terms of initial therapy after six and 18 months.

In almost all cases, patients were able to decrease their HbA1c by up to 2%, regardless of whether they were insulin-naive or on other insulin formulations. This is an excellent reduction without doctor involvement. Did they have a lot of hypoglycaemic events, especially as the achieved HbA1c is of the order of 6%? In fact, the number of hypoglycaemic events decreased significantly from the outset in patients already using insulin before the introduction of the titration tool (Figure 3).

### Table 1: BIAsp 30 self-titration: hypoglycaemic events

<table>
<thead>
<tr>
<th>Pre-study therapy</th>
<th>Baseline (events/patient/year)</th>
<th>18 months (events/patient/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulin-naïve (n = 90)</td>
<td>0</td>
<td>0.1</td>
</tr>
<tr>
<td>BHI 30 (n = 21)</td>
<td>8.1</td>
<td>0.3</td>
</tr>
<tr>
<td>NPH insulin (n = 18)</td>
<td>5.3</td>
<td>0.1</td>
</tr>
<tr>
<td>Insulin glargine (n = 20)</td>
<td>0.2</td>
<td>0.1</td>
</tr>
</tbody>
</table>

* p < 0.001


**Figure 2. BIAsp 30 self-titration: reduction in HbA1c**

**Figure 3. BIAsp 30 self-titration: hypoglycaemic events**

91% of patients achieved HbA1c < 7%
The success of this approach allows the clinician to focus on other important areas requiring his attention, including the initiation of insulin in other patients. The conclusion is that patient self-titration is both effective and safe.

A second study, the INITIATEplus study4 undertaken in the USA, used the same titration tool. This study of patients using BIAsp 30 bid requiring up-titration provided either no telephonic counselling, one telephone counselling session or three sessions. This study sought to determine the level of support required from diabetes educators in order to use the titration tool effectively. The study showed similar reductions in HbA1c at all levels of counselling (Figure 4).

Figure 4. INITIATEplus: reduction in HbA1c

- Similar decreases in HbA1c (2.4–2.5%) across regimens
- Most substantial decreases in HbA1c occurred in the first 12 weeks but further reduction occurred in the second 12-week period
- Overall, 41% and 28% of patients achieved HbA1c target levels of <7% and ≤6.5%, respectively, by week 24

Figure 5. Once-daily BIAsp 30: dinner dosing adjustment

1. The three most recent blood glucose levels taken from before breakfast are examined
2. The lowest is found
3. This number is matched to the range shown in Row A
4. Row B shows by how much the next insulin dose must be increased or reduced, or whether no change is needed
5. Any dose change takes place at the patient’s dinner (evening meal) injection
6. Any dose change is recorded in the patient’s record book

<table>
<thead>
<tr>
<th>Blood glucose levels:</th>
<th>Too low</th>
<th>Just right</th>
<th>Too high</th>
</tr>
</thead>
<tbody>
<tr>
<td>Row A: glucose level before breakfast (mmol/L)</td>
<td>Below 4.0 (&lt;72mg/dL)</td>
<td>4.0–4.4 (72–79mg/dL)</td>
<td>4.5–6.0 (81–108mg/dL)</td>
</tr>
</tbody>
</table>

Row B: Change your next dinner dose by:
- Contact doctor or diabetes educator
- Reduce by 2 units
- No change
- Add 2 units
- Add 4 units

| Contact your doctor or diabetes educator | No change |
| Reduce your next dinner injection dose as shown | Increase your next dinner injection dose as shown |

Figure 6. Once-daily BIAsp 30: breakfast dosing adjustment

1. The three most recent blood glucose levels taken from before dinner are examined
2. The lowest is found
3. This number is matched to the range shown in Row A
4. Row B shows by how much the next insulin dose must be increased or reduced, or whether no change is needed
5. Any dose change takes place at the patient’s breakfast (morning meal) injection
6. Any dose change is recorded in the patient’s record book

<table>
<thead>
<tr>
<th>Blood glucose levels:</th>
<th>Too low</th>
<th>Just right</th>
<th>Too high</th>
</tr>
</thead>
<tbody>
<tr>
<td>Row A: glucose level before dinner (mmol/L)</td>
<td>Below 4.0 (&lt;72mg/dL)</td>
<td>4.0–4.4 (72–79mg/dL)</td>
<td>4.5–6.0 (81–108mg/dL)</td>
</tr>
</tbody>
</table>

Row B: Change your next breakfast dose by:
- Contact doctor or diabetes educator
- Reduce by 2 units
- No change
- Add 2 units
- Add 4 units

| Contact your doctor or diabetes educator | No change |
| Reduce your next breakfast injection dose as shown | Increase your next breakfast injection dose as shown |
The tool shows clearly the action required, also indicating a ‘red zone’ where the clinician/diabetes educator should be contacted. The frequency of self-titration and therefore adjustment can be individualized, i.e. the readings can be taken on three consecutive days or once a week (on a Monday, Wednesday or Friday, for example). The clinician can decide how intensively he wants this to be done, thereby tailoring the ongoing management plan. “This is not a race – the patient will eventually get to his/her optimal insulin titration.”

In tailoring the ongoing management plan, you can add guidance suitable to your available resources. For example, “Call your doctor or diabetes educator if:
• You have very low blood glucose levels (<4mmol/l)
• You often have high blood glucose levels (more than ___ mmol/l)
• You become sick at any time
• You reach an insulin dose of ___ units.”

Individualise the glucose levels and the missing number of insulin units.

Case studies

**CASE STUDY 1 – CHRISTINE**

- Christine is an insulin-naïve patient who has just started taking once-daily BIAsp 30, 12U before dinner
- Using the BIAsp 30 self-titration tool, calculate the insulin dose change for her
- The following figure reflects her readings:

<table>
<thead>
<tr>
<th>Type of Insulin</th>
<th>Units Given</th>
<th>Monitoring Blood Glucose</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Breakfast</td>
<td>Lunch</td>
<td>Dinner</td>
</tr>
<tr>
<td>Mon BIAsp 30</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tues BIAsp 30</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wed BIAsp 30</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thurs BIAsp 30</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fri BIAsp 30</td>
<td>14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sun</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- The lowest reading she must pay attention to is 6.2
- The tool shows she should increase the insulin dosage by 2U to 14U
CASE STUDY 2 – DAVID

- David is taking once-daily BIAsp 30, 30U before breakfast
- Using the BIAsp 30 self-titration tool, calculate the insulin dose change for him
- The following figure reflects his readings:

<table>
<thead>
<tr>
<th>Type of Insulin</th>
<th>Units Given</th>
<th>Insulin injections</th>
<th>Monitoring Blood Glucose</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Breakfast</td>
<td>Lunch</td>
<td>Dinner</td>
</tr>
<tr>
<td>Mon</td>
<td>BIAsp 30</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Tues</td>
<td>BIAsp 30</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Wed</td>
<td>BIAsp 30</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Thur</td>
<td>BIAsp 30</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Fri</td>
<td>BIAsp 30</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Remarks**

- Activity, illness, diet changes, time of hypoglycaemia, noting blood-glucose and treatment.

- Focusing on the dinner readings, the tool shows that you should add 4U

References


Disclaimer

The views and opinions expressed in the article are those of the presenters and do not necessarily reflect those of the publisher or its sponsor. In all clinical instances, medical practitioners are referred to the product insert documentation as approved by relevant control authorities.