



Sandra Waddingham  
Diabetes Co-ordinator  
North Lancs PCT

# Diabetes



## HOW TO PREVENT AND MANAGE LIPOHYPERTROPHY AT INJECTION SITES

**L**ipohypertrophy is surprisingly common in people using insulin to control their diabetes. As more and more people with diabetes are managed in primary care, practice nurses take on a greater role in the management and education of these patients. This article considers what lipohypertrophy is, how it can be prevented and how it should be managed once it has been identified.

Tight blood glucose control is very important in patients with diabetes in order to reduce the long-term risk of vascular complications. In people with type 2 diabetes, the risk of heart disease and stroke is two to four times higher than in the general population and life expectancy is 5-10 years lower. Diabetes is also the leading cause of blindness, end-stage renal disease and lower-limb amputations in the western world.

The Diabetes Control and Complications Trial (DCCT) and the United Kingdom Prospective Diabetes Study (UKPDS) established beyond doubt that tight blood glucose control

significantly reduces the development of diabetes complications in type 1 and type 2 diabetes, as well as improving the day-to-day wellbeing of the patient. In line with this research, the recently reviewed National Institute for Health and Clinical Excellence (NICE) guidelines for the management of type 2 diabetes (CG66) recommends a target HbA<sub>1c</sub> level of 6.5% for most people with type 2 diabetes, although this should be agreed with each patient. Over the years, HbA<sub>1c</sub> targets for controlling blood glucose levels have been gradually lowered, which has necessitated patients taking more therapies to reach those targets.



**“Lipohypertrophy is the term used to describe the soft fatty swellings that develop as a result of repeated insulin injections into the same small area of an injection site”**

# Diabetes



The UKPDS demonstrated that type 2 diabetes is progressive, with insulin sensitivity and beta-cell function declining over time, resulting in gradual deterioration of glycaemic control. As a result, constant reassessment of lifestyle and treatment regimens to maintain adequate glycaemic control is vital. In practical terms, this means that a person with type 2 diabetes who is initially able to maintain glucose control within NICE guidelines with diet only, will eventually need further therapy.

As diabetes progresses over the years, it will be necessary to add tablets in order to maintain glucose control. In addition, it is likely that the patient may, at some stage, progress to requiring treatment with insulin. For this reason, a significant number of people with type 2 diabetes need insulin and tablets to maintain their blood glucose control. As many of these patients are managed in primary care, it is vital that practice nurses understand what lipohypertrophy is, how to manage it and how to prevent its occurrence.

## WHAT IS LIPOHYPERTROPHY?

Lipohypertrophy is the term used to describe the soft fatty swellings that develop as a result of repeated insulin injections into the same small area of an injection site. It is thought to be caused by the response of the fat cells to the presence of insulin. It is usually painless and can be identified by the unevenness of the skin and the soft lumpiness felt on palpation. However, it often goes unnoticed by patients and healthcare professionals because they rarely check injection sites.

### Indicators for lipohypertrophy

- Fluctuating blood glucose levels
- Recurrent hyperglycaemia
- Unpredictable hypoglycaemia
- High HbA<sub>1c</sub>.

## WHAT RESEARCH TELLS US ABOUT INJECTION SITES

Studies confirm that lipohypertrophy is a common problem, affecting more than half of patients using insulin. There is a greater incidence among people with type 1 diabetes and in females, although the reasons are not clear. Most patients rotate their injection sites although they tend to use only a very small area of each site, about the size of a 50 pence piece. Patients are usually advised about the importance of regularly changing injection sites,



although in a study almost half said a doctor or nurse had never checked them and no patients reported regular checks.

## LIPOHYPERTROPHY AND GLYCAEMIC CONTROL

Lipohypertrophy has been shown to directly affect glycaemic control. The lumpiness in the subcutaneous layer causes insulin to be absorbed erratically giving rise to fluctuating blood glucose levels. In turn, this might cause recurrent hyperglycaemia and unpredictable hypoglycaemia. A patient's blood glucose readings typically vary widely, for example, between 2 and 20 mmol/L. Their HbA<sub>1c</sub> is usually high.

## FACTORS INFLUENCING SUSCEPTIBILITY TO LIPOHYPERTROPHY

Several factors are thought to influence a patient's susceptibility to lipohypertrophy. We know that injecting into the same small area of one injection site increases the probability of the problem occurring. The volume of daily insulin and the number of injections per day also influence the risk. The longer a patient has been using insulin, the greater the likelihood of lipohypertrophy. Poor injection technique can also contribute and increase the likelihood of problems.

The re-use of needles is very common, with most patients using needles three or four times before renewing them, and some admit to using the same needle for three or four days. Needles become blunt with repeated use, and their lubrication is lost, making injections painful and trauma to the injection site more likely.

## CARE OF INJECTION SITES

The available evidence tells us that most patients injecting insulin are advised to rotate injection sites and how to do this. However, regular monitoring for lipohypertrophy and continuing education of the patient on self-management and care of their injection sites is less evident.

People with diabetes using insulin need to be aware of what lipohypertrophy is, how to prevent it and the possible impact it can have on their diabetes. If a patient is sensible about their diet, watches their weight, adjusts insulin doses and generally takes their diabetes seriously, all their hard work can be undone by lumpy injection sites absorbing insulin erratically, seriously affecting diabetes control and the risk of complications.

Patients should be advised to check their injection sites regularly by looking and feeling for any lumpiness. When starting on insulin, they need to be aware of the importance of using the whole area of the injection site, and warned about the natural tendency people have to gravitate to a small area depending on their dominant hand. A new needle should be used for each injection.

Having given people the initial advice, it is essential, as with all other aspects of patient education, to reinforce the message regularly. Evidence suggests that people with diabetes do not have an adequate understanding of how or why injection sites need looking after, and practice nurses are well placed to make a real difference in highlighting this important aspect of diabetes care.

# Diabetes



## Patient checklist for care of injection sites

- Use a new needle for every injection
- Use the whole injection site, rotating within each area
- Pay attention to injection technique
- Check injection sites for lumpiness on a regular basis.

## HOW TO EXAMINE INJECTION SITES

Diabetes UK recommends that injection sites should be examined by a healthcare professional each year at the annual review. At the moment, patients are commonly asked about injection sites but are not routinely examined.

When examining the patient, firstly look at the whole injection site – is it symmetrical and even? As the dominant hand gravitates to one specific area of the injection site this can lead to lipohypertrophy at one side, giving an uneven appearance. Next, carefully palpate the area for lumpiness and possible problem areas. Evidence of trauma at the site of recent injections might prompt you to discuss injection technique with the patient.

## INJECTION TECHNIQUE

Insulin should be injected into the subcutaneous fatty layer that lies between the skin and the muscle layer. The recommended sites are the upper outer aspects of the thighs, the abdomen (below and either side of the navel), and the upper outer aspects of the buttocks. The upper aspects of the arms are no longer recommended because there is less available fat and a greater risk of injecting into the muscle.

Patients should be advised that the short fine needles used for injecting insulin should be used at right angles to the skin to reach the subcutaneous fat layer and ensure efficient absorption. The skin should first be carefully pinched up before inserting the needle, then following the injection, the needle should be held in the skin for 10 seconds to avoid insulin leakage after needle withdrawal.

## MANAGEMENT OF LIPOHYPERTROPHY

If a patient develops lipohypertrophy, the affected area must not be used for injecting insulin for at least three months, or until the lumpiness has



completely disappeared. Lipohypertrophy settles in time, but, in severe cases, can take as long as a year to resolve. It makes obvious sense to advise the patient to stop using the affected area(s) to allow recovery.

Reinforce the message about rotation and care of injection sites, encouraging the patient to make regular self-checks. Insulin doses will need to be reduced by 10% regardless of poor glycaemic control. As insulin absorption improves, the risk of hypoglycaemia increases, hence the need to reduce insulin doses.

Amazingly, case studies have shown that glycaemic control improves significantly despite reducing insulin doses, with as much as 2-3% improvement in HbA<sub>1c</sub> being reported. Within three

months, an improvement in control can be expected and the frequency of hypoglycaemia should be significantly less.

## Key points: Lipohypertrophy

- Educate patients to increase awareness and reduce the risk of lipohypertrophy
- Advise patients to use a wide area of each injection site
- A new needle should be used for each insulin injection
- Lipohypertrophy is an important problem because it can adversely affect blood glucose control by affecting insulin absorption
- Diabetes UK recommends checking injection sites at the annual review.

## more information

- Sonksen P, Fox C, Judd S. *Diabetes at your fingertips*. Fifth ed. London: Class 2003.
- Vardar B, Kizilci S. Incidence of lipohypertrophy in diabetic patients and a study of influencing factors. *Diabetes Research and Clinical Practice* 2007; **77**(2): 231-6.
- Hambridge K. The management of lipohypertrophy in diabetes care. *British Journal of Nursing* 2007; **16**(9): 520-4.
- Chowdhury TA, Escudier V. Poor glycaemic control caused by insulin induced lipohypertrophy. *British Medical Journal* 2003; **327**: 383-4.
- Teft G. Lipohypertrophy: patient awareness and implications for practice. *Journal of Diabetes Nursing* Jan-Feb 2002.
- [www.diabetes.org.uk](http://www.diabetes.org.uk)
- The management of type 2 diabetes. NICE guidance. <http://www.nice.org.uk/nicemedia/pdf/CG66NICEGuidelinepdf>