

# Diabetes Case Study Feedback

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## Reviewers

### GP Panel members

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## Notes

### Guest Cardiologist

Dr Rick Cutfield, North Shore Hospital

### Panel comments summarised and edited by

Dr Katrina Sandford, General Practitioner and programme developer, bpac<sup>nz</sup>

### Acknowledgement

bpac<sup>nz</sup> would like to thank the panel and guest specialist for their support and contribution to the discussion provided by this case.

### Feedback

bpac<sup>nz</sup> welcomes comments on this case study.

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© bpac<sup>nz</sup> Diabetes case study results



## Case Study: Diabetes

### Case

*Mrs. Ridell is a 49 year old patient of yours who you see occasionally for mild asthma. At a recent visit you undertook some opportunistic tests for cardiovascular risk assessment. Results showed a raised fasting glucose. You contacted Mrs. Ridell and arranged for some further tests to be done and for her to come back today for review and discussion of the results.*

*Relevant history findings :*

*Past hx : Asthma, mild*

*No other chronic medical problems*

*Meds : ventolin PRN*

*Shx : Married, 3 children, gave up smoking 2 years ago  
Works part-time in a supermarket*

*Fhx : Mother NIDDM, died MI age 67*

*Relevant examination findings :*

*Pulse 80 reg BP 150/85 good peripheral pulses*

*Weight 76kg BMI 29 Waist Circumference 92cm*

*Test results :*

*Fasting glucose 6.7mmol/L OGTT(2 h) 8.9mmol/L*

*Lipids : Total chol. 6.3 LDL 2.8 ratio 6.0*

### Notes

- This case study has now closed. CME points have been entered for those who responded by 24 November.
- Winners of Murtagh's General Practice and the Colour Atlas of Dermatology will be notified individually.

1. Based on these results Mrs. Ridell could be described as having :

- Diabetes                       Pre-diabetes

You discuss lifestyle approaches to managing her condition, and refer her to a dietitian for specific dietary advice. In accordance with guidelines you also recommend undertaking some moderate physical activity on a regular basis.

2. Which one of these activities is considered to be “moderate intensity physical activity”?

- Gentle walking             Brisk walking             Jogging             Gardening

Two years later : Findings at a review include : BP 160/90 weight 75kg  
HBA1c : 7.5% Fasting glucose : 8.0mmol/L Lipids : Total chol. 6.0 LDL 2.7 Ratio 6.0  
ACR : 3.0 Cr 0.09

Mrs. Ridell has made some lifestyle changes but has found these difficult to maintain. You conclude commencement of oral hypoglycaemic drug treatment is now indicated.

3. When initiating oral hypoglycaemic treatment, what drug(s) would you choose?

Drug \_\_\_\_\_ Dose \_\_\_\_\_ Frequency \_\_\_\_\_  
\_\_\_\_\_

4. Would you advise blood glucose self monitoring?

No             Yes (specify frequency) \_\_\_\_\_

5. Would you prescribe any other drugs at this stage?

No             Yes (specify) \_\_\_\_\_

Six years later: Mrs. Ridell's glycaemic control initially improves, but gradually deteriorates despite maximal oral therapy. She has had some early retinopathy detected and treated. Mrs. Ridell is well educated about managing her condition, and has rarely had problems with hypoglycaemia. At her latest review you find her HBA1c is 8.5% and after discussion it is agreed insulin treatment is appropriate. Her blood glucose levels tend to be higher in the morning.

6. Give an example of a starting insulin regimen that would be suitable for someone such as Mrs. Ridell:

Insulin type \_\_\_\_\_ Dose \_\_\_\_\_ Frequency \_\_\_\_\_  
\_\_\_\_\_

Assume Mrs. Ridell's oral therapy includes metformin.

7. Should she continue taking metformin now she is on insulin?

- Yes             No

**Bonus Questions** (all correct responses will go into a draw to win a colour atlas of dermatology)

Mrs. Ridell develops a pretibial skin problem some years later (pictured). The problem started as a red-brown plaque, which gradually enlarged over months. The centre of the plaque has a waxy yellow appearance and has become atrophic. There has been no response to antibiotics.



8a. What is this rare skin condition?

\_\_\_\_\_

8b. How would you manage this?

\_\_\_\_\_

## Case results with GP panel comments

### Q1. Classification

Pre-diabetes:	75%
Diabetes:	25%

#### Panel comments

Mrs. Ridell has prediabetes, more specifically impaired glucose tolerance (IGT). The diagnostic criteria for diabetes are :

- two fasting glucose levels = 7.0 mmol/L on two different days; or
- two random glucose results of > 11.0 mmol/L on two different days

IGT is defined by : fasting glucose < 7.0 and 2h OGTT = 7.8 and = 11.1

Impaired glucose tolerance represents a pre-diabetic state. Over 5 years about 60% of people with impaired fasting glucose (IFG) and IGT will go on to develop diabetes.

One panel member pointed out that over-diagnosing diabetes here is probably beneficial to the patient rather than detrimental as it may result in more intensive early treatment.

### Q2. Which activity is classified as moderate intensity?

Brisk walking :	95%
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Physical activity is recommended for people with diabetes or pre-diabetes in particular, as activity can improve insulin sensitivity, decrease cardiovascular mortality and aid weight loss. There seems to be a threshold effect for decreasing cardiovascular mortality, with around 150 min/week of at least moderate intensity activity to provide benefit. For people with pre-diabetes physical activity and dietary measures can reduce the risk of developing diabetes by up to 58%. A green prescription can be useful for encouraging increased physical activity.

### Q3. Which oral hypoglycaemic would you use first line?

Metformin:	99.5%
Sulphonylurea:	0.5%

There were occasional comments about the possibility of using a glitazone, and a comment that metformin could be used earlier to aid weight loss.

Doses (metformin)

500mg BD:	67%
500mg OD:	20%
500mg tds:	5%

Some noted they would titrate upwards slowly to minimize GI adverse effects.

**Panel comments**

Metformin is appropriate first line for this lady. Metformin is recommended as the first-line oral therapy in overweight people with type II diabetes (NZGG). This recommendation is based on findings from the UK Prospective Diabetes Study (UKPDS), which showed metformin decreased the incidence of macrovascular complications in overweight people with diabetes more successfully than other treatments. Metformin has the advantages of tending to aid weight loss, and not causing hypoglycaemia. Renal function should be checked before initiating metformin, as renal impairment is a risk factor for lactic acidosis. Mrs. Ridell has a calculated creatinine clearance of 80ml/min which is in the lower range of normal (depending on reference range used). Gastric side effects such as diarrhoea are common when initiating metformin treatment, these tend to be transient and can be minimised by titrating the dose up slowly.

**Q4. Would you advise self blood glucose monitoring?**



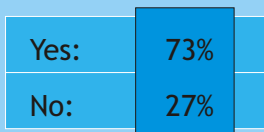
Of those who said yes and detailed a specific regimen :

- 75% advised testing regularly(2 to 4x/day) on 1 , 2 or 3 days per week. Some said pre-meals, some said post-prandial, some said at random times.
- A few suggested daily testing (5%)
- The remainder either suggested less frequent testing e.g. monthly or when unwell.

**Panel comments**

There is a lack of consensus on the most appropriate testing regimen for patients such as Mrs Ridell who are on metformin only. Metformin does not cause hypoglycaemia, so testing for this possibility is not indicated. There is a surprising lack of evidence that regular self-testing improves outcomes in this situation. Checking HBA1c is the best way to assess diabetes control. Regular testing is probably not necessary, but testing in some specific circumstances could be justified e.g. in the initial period to illustrate how diet can affect glucose levels, or when a change in treatment is being considered.

**Q5. Would you prescribe any other drugs ?**



Of all respondents :

68%	would prescribe a statin
64%	would prescribe an ACE inhibitor
36%	would prescribe aspirin
10%	“other” (thiazide, beta-blocker, glitazone)

31% would prescribe all 3 drugs : ACE + statin + aspirin

### Panel comments

Much of the excess morbidity and mortality associated with diabetes is related to CVD; measures to reduce CVD risk are a key part of diabetes management. CVD risk assessment is recommended yearly for patients with diabetes, treatment decisions should be based on absolute risk levels. Mrs. Ridell has a risk level of at least 10-15% or “moderate”, this would rise to 15-20% or “high” if following the NZGG recommendation to add 5% to calculated risk if the metabolic syndrome is present, or if she were of Maori/Pacific Island or Indian subcontinent ethnicity (her ethnicity has not been specified). Treatment with low-dose aspirin and a statin should be considered, although the importance of lifestyle interventions should not be forgotten.

An ACE inhibitor is indicated for Mrs. Ridell, with the goal of lowering blood pressure to below 130/80 and offering some renal protection. A related question is should Mrs. Ridell's hypertension have been treated earlier. Some panel members thought earlier antihypertensive treatment was indicated while others would wait to see the result of lifestyle measures.

If it was determined treatment with all 3 drugs was appropriate (ACE, statin, aspirin) in practice it would probably be better to introduce these gradually, as Mrs. Ridell may not be too keen to come away from this consultation with a prescription for four new drugs.

### Q6. Starting insulin regimen

A few people commented they didn't know here and would refer to a specialist.

Of those who did answer this question:

80% would prescribe intermediate acting insulin, either alone (66%) or as one of the premixes (14%)

- 85% of isophane prescribers would start with a nocte dose; 10 iu most commonly. Range between 6 and 30.
- 63 % of premix prescribers would start with BD dosing, doses ranged from 5-30 units.

**Panel comments**

The preference for starting with a once daily dose of intermediate acting insulin seems reasonable. The NZGG guidelines on this issue recommend an intermediate acting insulin O/D initially either morning or night depending on the blood glucose profile. The recommended initial dose is 6-10 units, increasing by 1-2 units every 3-4 days until blood glucose targets are reached. This starting dose of insulin is relatively low and unlikely to cause hypoglycaemia, as insulin resistance is a feature of type II diabetes.

**Q7. Continue metformin?**

Yes: 98%

**Panel comments**

It is good to see most people advocated continuing metformin. Metformin decreases insulin resistance, lessening the amount of insulin required. If Mrs. Ridell were to stop metformin her insulin dose would need to be increased. She is also less likely to gain weight (a common occurrence when insulin is started) if she stays on metformin.

*Bonus question***Q8. Skin lesion**

2/3 of people chose to answer this question. Of those who answered it 84% correctly identified necrobiosis lipidica diabetorum.

**Management**

Many mentioned topical or intralesional steroids, good diabetes control and/or protection from trauma. Many noted there are no particularly efficacious treatments.

**Panel comments**

Necrobiosis lipidica (NL) is a rare skin condition associated with diabetes. It may also occur in non-diabetic people however. The incidence in diabetic patients is around 0.3% . Although it looks unsightly it is a relatively benign condition. It is a disorder of collagen degeneration with a granulomatous response, thickening of blood vessel walls, and fat deposition. The exact cause is unknown, but the leading theory of NL has focused on diabetic microangiopathy. Other theories suggest trauma or inflammatory or metabolic changes, or that an antibody-mediated vasculitis may cause the changes seen in NL. The course is variable but tends to be chronic. There are no particularly efficacious treatments, but the following treatments are sometimes successful :

- Topical steroids, usually under a plastic occlusive dressing

- Intralesional steroid injections or steroid tablets
- Aspirin and dipyridamol combination
- Pentoxifylline tablets
- Photochemotherapy (PUVA) (from dermnet <http://dermnetz.org/systemic/diabetes.html>)

Protection from trauma to the affected area is advisable as ulceration can result.



It is hard to improve on the answers already provided for the Diabetes Case Study feedback but let me just make a few comments:

### Question 1:

The patient has both impaired fasting glucose and impaired glucose tolerance. The term pre-diabetes has been used rather loosely to put these two categories together. They are not exactly equivalent. The risk of developing cardiovascular disease seems to be greater with impaired glucose tolerance alone, although both are associated with an increased risk of diabetes and the risks seem to be higher when IGT and IFG co-exist. The important thing is that studies suggest that people with impaired glucose tolerance can, with significant lifestyle changes, reduce their risk of developing diabetes by at least 50%.

### Question 3:

Metformin is the drug of choice and most will start with 500mg twice daily, building up slowly as tolerated to an average dose I suppose of 1g twice daily. Metformin can help weight loss but is not a particularly good weight losing agent by itself in people without diabetes. There was a question of using a Glitazone. In people with significant obesity and particularly with obvious insulin resistance and truncal obesity, there is a real place for Glitazones if Metformin is not tolerated or contraindicated.

### Question 4: - is controversial:

The panel comments are correct. Self monitoring of blood glucose should only be done if it is used to adjust medication or diet. I think the comments made by the panel are sensible and in patients on Metformin alone, there is virtually no risk of hypoglycaemia and fasting glucose and Hb A1c is a reasonable way to monitor the situation, given that our new guideline for an Hb A1c is down to 6.5%. Occasional two hour post prandial tests can give a hint as to which foods or meals are more suitable. Not everybody however is that motivated to test in this situation. Self monitoring may be helpful early on when glucose levels are changing or during illness, even in patients as described in the case study.

### Question 5:

The patient has a persistently elevated LDL cholesterol according to the numbers and if her hypertension is persistently elevated, measured in the correct way, then she probably does have with diabetes, hypertension and dyslipidaemia, a sufficiently high 5 year cardiovascular risk to warrant the use of a statin. The presence of persistently elevated microalbumin is an additional and independent predictor of cardiovascular mortality. If she had a significantly elevated triglyceride level over 4, then a fibrate might be a reasonable first choice but the evidence is much stronger for the use of statins in 2004. If her blood pressure remains at 150/80 then she should be treated



## Specialist Comments

and the first drug of choice would be an ACE inhibitor. I think it would be entirely reasonable to see what effect lifestyle changes have first before starting ACE inhibitors but given the presumed persistent microalbuminuria, then either an ACE inhibitor or Angiotensin 2 blocker would be the drugs of choice, based on evidence. The increased cardiovascular risk further justifies the use Aspirin 75-100mg.

### Question 6& 7:

The Hb A1c target needs to be individualised but as a minimum she should be aiming for an Hb A1c of 7% and with elevated fasting glucose levels it would be reasonable to start this patient next on an isophane insulin at bed to normalise the pre breakfast test aiming for a level of 6mmol/L. Self monitoring throughout the rest of the day will give a clue as to whether twice daily Protophane or Penmix or other combinations would be best. As has been mentioned before, there are many ways to initiate insulin but many people today would start this patient on evening Protophane with continued Metformin. The Sulphonylurea dose during the day may need to be decreased. Once patients are on twice daily Protophane there does seem little point in continuing Sulphonylurea. Metformin is useful to continue if you suspect continuing insulin resistance [truncal obesity may be a good marker of this].

Some patients may not want insulin and in this patient there are some other possibilities. As she is on maximal Sulphonylurea and Metformin she could try a Glitazone although this is not funded in NZ. There is some evidence that triple therapy can be effective and I have found this combination sometimes useful in patients as long as they do not have evidence of significant insulin deficiency with very high Hb A1c and fasting glucose levels. Acarbose in general will reduce Hb A1c about 0.5% and helps postprandial glucose levels. It would have only a small effect in this patient with the likelihood of GI side effects.

Yours sincerely

**Dr RG CUTFIELD**  
Physician and Endocrinologist

29/11/04

## A possible marking schedule

If you wish to score your case a possible marking schedule is detailed below. The “correct” answers are based on a literature search of relevant evidence and panelist's/specialists feedback comments.

Q1. Score 2 points if you chose pre-diabetes.	Max. 2 points
Q2. Score 2 points if you chose brisk walking.	Max. 2 points
Q3. Score 2 points if you specified metformin. Score 1 point if you specified a dose of 500mg bd or less, or if you noted gradual upwards titration is advisable.	Max. 3 points
Q4. Score 2 points if you chose “no” or if you specified testing only initially or under specific circumstances.	Max. 2 points
Q5. Score 2 points for an ACE inhibitor. Score 1 point for a statin/low dose aspirin.	Max. 4 points
Q6. Score 2 points if you stated a regimen involving intermediate acting insulin OD. Score 1 point if you stated a dose of 6-10 units.	Max. 3 points
Q7. Score 1 point for yes.	Max. 1 point
<hr/>	
Total = 17	

### **Bonus Question :**

Score 1 point for necrobiosis lipoidica.

Score 1 point for steroids/aspirin/pentoxifylline/trauma protection.

Score 1 point if you noted no particularly efficacious treatment.

Max. = 3 points

Based on a sample scored in this way the average score was 13-14/17 or 79%.

Well done!