FRAILTY & DIABETES

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LEARNING OUTCOMES

BY THE END OF THIS SESSION, ATTENDEES WILL:

• HAVE AN UNDERSTANDING OF THE TERM FRAILTY
• HAVE AN UNDERSTANDING OF THE IMPACT OF FRAILTY ON THOSE PEOPLE WITH DIABETES
• BE AWARE OF THE PRACTICAL IMPLICATIONS OF MANAGING FRAILTY
  - TARGETS
  - MEDICATION CHOICE
  - DE-INTENSIFICATION
• MANAGING CASES
WHO IS ‘OLD’?

• CHRONOLOGICAL VS PHYSIOLOGICAL VS FUNCTIONAL AGE

OFFICE FOR NATIONAL STATISTICS (ONS)
- 65YRS

WORLD HEALTH ORGANISATION (WHO)

‘SOMEONE WHOSE AGE HAS PASSED THE MEDIAN LIFE EXPECTANCY AT BIRTH’
UK – 81.2YRS AFRICA – 50-55YRS
WHAT IS FRAILTY?

• THERE ARE LOTS OF DIFFERENT DEFINITIONS

BERGMAN ET AL (2007) DESCRIBE IT AS

“AN ADVERSE HEALTH STATE REPRESENTED BY AN INCREASED VULNERABILITY TO PHYSICAL OR PSYCHOLOGICAL STRESSORS AS A RESULT OF DECREASED PHYSIOLOGICAL RESERVE’

• A SERIOUS BUT MANAGEABLE COMPLICATION OF DIABETES

• TYPE 2 DIABETES IS A RISK FOR DEVELOPMENT OF FRAILTY (SINCLAIR, 2019)
ALL OLD PEOPLE ARE FRAIL

ALL FRAIL PEOPLE ARE OLD
SO WHICH OF THESE PEOPLE ARE FRAIL?
NOT ALWAYS SO CLEAR CUT

https://youtu.be/CZeMZ3WPuLY
# Functional capacity

<table>
<thead>
<tr>
<th>Functionally Independent</th>
<th>Functionally Dependent</th>
<th>End of Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADLs independent</td>
<td>Impaired ADLs</td>
<td>Limited life expectancy</td>
</tr>
<tr>
<td>Self-caring</td>
<td>Supported for self-care</td>
<td>Focus on symptoms</td>
</tr>
<tr>
<td>No carers</td>
<td>Dementia and frail subgroups</td>
<td></td>
</tr>
</tbody>
</table>
Timed Up and Go (TUG) Test

Name: ___________________________ MR: ___________________________ Date: ______

1. Equipment: arm chair, tape measure, tape, stop watch.

2. Begin the test with the subject sitting correctly (hips all the way to the back of the seat) in a chair with arm rests. The chair should be stable and positioned such that it will not move when the subject moves from sit to stand. The subject is allowed to use the arm rests during the sit – stand and stand – sit movements.

3. Place a piece of tape or other marker on the floor 3 meters away from the chair so that it is easily seen by the subject.

4. Instructions: “On the word GO you will stand up, walk to the line on the floor, turn around and walk back to the chair and sit down. Walk at your regular pace.”

5. Start timing on the word “GO” and stop timing when the subject is seated again correctly in the chair with their back resting on the back of the chair.

6. Normative Reference Values by Age

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Time in Seconds (95% Confidence Interval)</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 – 69 years</td>
<td>8.1</td>
</tr>
<tr>
<td>(7.1 – 9.0)</td>
<td></td>
</tr>
<tr>
<td>70 – 79 years</td>
<td>9.2</td>
</tr>
<tr>
<td>(8.2 – 10.2)</td>
<td></td>
</tr>
<tr>
<td>80 – 89 years</td>
<td>11.3</td>
</tr>
<tr>
<td>(10.0 – 12.7)</td>
<td></td>
</tr>
</tbody>
</table>

7. Cut-off Values Predictive of Falls by Group

<table>
<thead>
<tr>
<th>Group</th>
<th>Time in Seconds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community Dwelling Frail Older Adults</td>
<td>&gt; 14 associated with high fall risk</td>
</tr>
<tr>
<td>Post-op hip fracture patients at time of discharge$</td>
<td>&gt; 24 predictive of falls within 6 months after hip fracture</td>
</tr>
<tr>
<td>Frail older adults</td>
<td>&gt; 30 predictive of requiring assistive device for ambulation and being dependent in ADLs</td>
</tr>
</tbody>
</table>

Clinical Frailty Scale

1. Very Fit – People who are robust, active, energetic and motivated. These people commonly exercise regularly. They are among the fittest for their age.

2. Well – People who have no active disease symptoms but are less fit than category 1. Often, they exercise or are very active occasionally, e.g. seasonally.

3. Managing Well – People whose medical problems are well controlled, but are not regularly active beyond routine walking.

4. Vulnerable – While not dependent on others for daily help, often symptoms limit activities. A common complaint is being “slowed up”, and/or being tired during the day.

5. Mildly Frail – These people often have more evident slowing, and need help in high order ADLs (finances, transportation, heavy housework, medications). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation and housework.

6. Moderately Frail – People need help with all outside activities and with keeping house. Inside, they often have problems with stairs and need help with bathing and might need minimal assistance (cuing, standing) with dressing.

7. Severely Frail – Completely dependent for personal care, from whatever cause (physical or cognitive). Even so, they seem stable and not at high risk of dying (within 6 months).

8. Very Severely Frail – Completely dependent, approaching the end of life. Typically, they could not recover even from a minor illness.

9. Terminally Ill – Approaching the end of life. This category applies to people with a life expectancy <6 months, who are not otherwise evidently frail.

Scoring frailty in people with dementia

The degree of frailty corresponds to the degree of dementia. Common symptoms in mild dementia include forgetting the details of a recent event, though still remembering the event itself, repeating the same question/story and social withdrawal. In moderate dementia, recent memory is very impaired, even though they seemingly can remember their past life events well. They can do personal care with prompting. In severe dementia, they cannot do personal care without help.

<table>
<thead>
<tr>
<th>eFl score</th>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–0.12</td>
<td>Fit</td>
<td>People who have no or few long-term conditions that are usually well controlled. This group would mainly be independent in day-to-day living activities</td>
</tr>
<tr>
<td>0.13–0.24</td>
<td>Mild frailty</td>
<td>People who are slowing up in older age and may need help with personal activities of daily living such as finances, shopping, transportation</td>
</tr>
<tr>
<td>0.25–0.36</td>
<td>Moderate frailty</td>
<td>People who have difficulties with outdoor activities and may have mobility problems or require help with activities such as washing and dressing</td>
</tr>
<tr>
<td>&gt;0.36</td>
<td>Severe frailty</td>
<td>People who are often dependent for personal care and have a range of long-term conditions/multimorbidity. Some of this group may be medically stable but others can be unstable and at risk of dying within 6–12 months</td>
</tr>
</tbody>
</table>

*eFl = electronic Frailty Index*
HOW ARE FRAILTY AND DIABETES RELATED?

• OLDER POPULATION
• MULTIMORBIDITY
• COMPLICATIONS
• MEDICATIONS
• ORAL INTAKE
• DEPENDENCY
• CARE SETTING
HOW ARE FRAILTY AND DIABETES RELATED?

- IN A TYPICAL ‘TIERS OF CARE’ MODEL – WHERE DO THIS COHORT OF PEOPLE FIT?
  - TIER ONE
    - TYPICALLY PRIMARY CARE LED, ‘UNCOMPPLICATED’ TYPE 2 PATIENTS, SOME INITIATION OF INSULIN, ANNUAL REVIEW
  - TIER TWO
    - SOME GP PRACTICES, COMMUNITY DIABETES NURSING TEAMS, SOME TYPE 1 SERVICES
  - TIER THREE
    - SPECIALIST SERVICES (GENERALLY SECONDARY CARE). TYPE 1 SERVICES, AND ‘SUPER SIX’ COHORT
NICE NG28 – TYPE 2 DIABETES IN ADULTS
INDIVIDUALISED CARE

• ADOPT AN INDIVIDUALISED APPROACH TO DIABETES CARE
  • TAILORED TO THE NEEDS AND CIRCUMSTANCES, TAKING INTO ACCOUNT THEIR PERSONAL PREFERENCES, COMORBIDITIES, RISKS FROM POLYPHARMACY, AND THEIR ABILITY TO BENEFIT FROM LONG-TERM INTERVENTIONS BECAUSE OF REDUCED LIFE EXPECTANCY.

• SUCH AN APPROACH IS ESPECIALLY IMPORTANT IN THE CONTEXT OF MULTIMORBIDITY.
  • REASSESS THE PERSON'S NEEDS AND CIRCUMSTANCES AT EACH REVIEW AND THINK ABOUT WHETHER TO STOP ANY MEDICINES THAT ARE NOT EFFECTIVE.

• TAKE INTO ACCOUNT ANY DISABILITIES
  • INCLUDING VISUAL IMPAIRMENT, WHEN PLANNING AND DELIVERING CARE FOR ADULTS WITH TYPE 2 DIABETES.
Relationship between HbA$_{1c}$ and all-cause mortality in older patients with insulin-treated type 2 diabetes: results of a large UK Cohort Study, Age and Ageing 2019; 0: 1–6
Li G et al. Frailty and Risk of Fractures in Patients With Type 2 Diabetes Diabetes Care 2019 Apr; 42(4): 507-513.
CURRENT AGENTS

- METFORMIN
- SULFONYLUREAS
- MEGLITINIDES
- THIAZOLIDINEDIONES
- DPP-4 INHIBITORS
- GLP-1 AGONISTS
- SGLT-2 INHIBITORS
- BASAL INSULIN
- PRE-MIXED INSULIN
- BASAL BOLUS
- NEWER INSULINS
HYPOGLYCAEMIC RISK OF ANTIHYPERGLYCAEMIC AGENTS ADDED TO METFORMIN

SU=sulphonylurea; DPP-4i=dipeptidyl peptidase-4 inhibitor; GLP-1RA=glucagon-like peptide-1 receptor agonist; TZD=thiazolidinedione; AGI=alpha glucosidase inhibitor.

Weiner JZ et al. Use and Discontinuation of Insulin Treatment Among Adults Aged 75 to 79 Years With Type 2 Diabetes. JAMA Intern Med. Published online September 23, 2019. doi:10.1001/jamainternmed.2019.3759
DE-INTENSIFICATION

• WHAT IS IT?
• RATIONALE
• HYPOGLYCAEMIA VS HYPERGLYCAEMIA
• PRACTICAL APPLICATION
  • ANY SUBGROUPS TO TARGET?
  • HOW WOULD YOU GO ABOUT THIS?
Proportion of patients with deintensification of glycemic treatment, by health status and within HbA1C strata.

DO WE EXCLUDE FROM QOF?

NOT ANY MORE!

Frailty in diabetes – QOF 2019

NM157 - The percentage of patients with diabetes without moderate or severe frailty, on the register, in whom the last IFCC-HbA1c is 58 mmol/mol or less in the preceding 12 months.

NM158 - The percentage of patients with diabetes with moderate or severe frailty, on the register, in whom the last IFCC-HbA1c is 75 mmol/mol or less in the preceding 12 months.
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eFl=electronic Frailty Index

Sinclair (2019) Guidelines in Practice
https://www.guidelinesinpractice.co.uk/diabetes/key-learning-points-diabetes-in-older-people-with-frailty/454910.article
POSSIBLE INTERVENTIONS

- Patient Stratification
- De-intensification
- At Risk Groups
- Local Guidelines
- Electronic Frailty Index (EFI) Scores
- Complex Regimes
- Care Homes
Future Model?

CASE STUDY - *BERYL

BERYL IS 79YRS OLD, LIVES ALONE

MILD DEMENTIA – HAS A BD CARE PACKAGE AND HELP WITH SHOPPING

CURRENTLY ON ONCE DAILY INSULIN (GLARGINE) ADMINISTERED BY DN’S

3 OF KEY CARE PROCESSES WITHIN LAST YEAR (NOT A FOOT CHECK)

DN’S CARRY OUT BLOOD GLUCOSE MONITORING AT TIME OF INSULIN

• WHAT ELSE WOULD YOU WANT TO KNOW?

• WOULD BERYL BE REGARDED AS ‘FRAIL’
*BERYL*

- **CURRENT MEDICATION:**
  - METFORMIN 500MG BD
  - GLARGINE (LANTUS) 18UNITS ONCE DAILY
    (COMMENCED DURING HOSPITAL ADMISSION 10 MONTHS AGO)
- **HBA1C**
  - CARRIED OUT AS PART OF A HOUSEBOUND PROJECT – 25MMOL
- **ACR**
  - CARRIED OUT 10 MONTHS AGO - 6
- **FOOT ASSESSMENT**
  - ASSESSED AS MODERATE RISK DUE TO SOME NEUROPATHY
• WHAT ARE YOUR CONCERNS?

• WHAT ARE YOUR PRIORITIES?
‘FALLING THROUGH THE NET’

• INITIAL FINDINGS FROM A HOUSEBOUND PROJECT
  • WITHIN ONE CCG (3 HUBS) – 54 PATIENTS IDENTIFIED ON THE DN CASELOAD
  • AT WEEKENDS STAFF OFTEN HAVE 8 VISITS FOR INSULIN ADMINISTRATION IN THE MORNING
  • LIMITED AMOUNT OF STAFF ADEQUATELY TRAINED IN THE SAFE ADMINISTRATION OF INSULIN – SEEN AS A TASK
  • ANNUAL REVIEW WAS AD-HOC AT BEST, NOT CARRIED OUT AT WORST (ONLY 2 PATIENTS HAD ALL 9 KEY CARE PROCESSES MET SO FAR)
CASE STUDY - JAMES

• 76YR OLD MAN – WIDOWED SIX MONTHS AGO
• HAS TYPE 2 DIABETES AND CORONARY HEART DISEASE
• LIVES ALONE AND ADMINISTERS OWN INSULIN
  • BD NOVOMIX 30 BREAKFAST AND EVENING MEAL
• DOCUMENTED AS ’FRAIL’ BY OUT OF HOURS GP
  • HAD VISITED AS PATIENT FELT GENERALLY UNWELL
JAMES

• DO YOU THINK JAMES IS FRAIL?

• WHAT COULD LEAD THE OOH GP TO CONSIDER HIM FRAIL?

• WHAT ARE YOUR MAIN CONCERNS?
JAMES

• ANNUAL REVIEW IN GP SURGERY
• BLOOD PRESSURE 135/85
• HBA1C 42MMOL
• RARELY DOES BG MONITORING AT HOME
• LOW FOOT RISK ASSESSMENT
• KIDNEY FUNCTION AND ACR NORMAL

• WHAT WOULD YOU DO?
Birmingham, Solihull, Sandwell and Environ Area Prescribing Committee (APC)

Type 2 diabetes mellitus

Guideline for the choice of oral and non-insulin antihyperglycaemic agents in adults

Diabetes Medicines Management Advisory Group (DMMAG)

Contents

1. Scope
2. Local prevalence of diabetes
3. Treatment goals in type 2 diabetes and patient-centred care
4. Managing blood glucose
5. Antihyperglycaemic treatment options for adults with type 2 diabetes
6. Key considerations to support drug selection
7. Addressing cardiovascular risk in type 2 diabetes
8. Self-monitoring of blood glucose and ketones
9. Drug dosing in renal impairment
10. Sick day rules
11. De-escalation of treatment
12. Special considerations for the frail elderly
12 - Special considerations for the frail elderly

There is increasing evidence that tight control of glucose and blood pressure in frail elderly people with diabetes can be harmful. This group are less likely to benefit from the long-term microvascular outcomes of good glycaemic control and have a marked increase in risk of hospital admissions. There is therefore a need to avoid over-treatment of both blood pressure and glycaemia.

Aims of treatment in the context of frailty should be:

1. To avoid hypoglycaemia
2. To control symptoms of hyperglycaemia
3. To reduce risk of infection
4. To avoid hospital admission
5. To introduce timely end-of-life care
6. To avoid complex regimes

NICE have changed some of the QOF diabetes indicators for primary care in 2019/20. People with moderate or severe frailty can now be excluded from tighter HbA1c and BP control:

**NM157** - The percentage of patients with diabetes **without** moderate or severe frailty, on the register, in whom the last IFCC-HbA1c is 58 mmol/mol or less in the preceding 12 months

**NM158** - The percentage of patients with diabetes **with** moderate or severe frailty, on the register, in whom the last IFCC-HbA1c is 75 mmol/mol or less in the preceding 12 month
The International Diabetes Federation global guideline for managing type 2 diabetes in older people (IDF, 2013) recommends very specific HbA1c targets (Table 1). Active steps must be taken to review this population, including an assessment of their level of frailty, and make appropriate plans.

**Table 1: General glycaemic targets for older people, according to functional category**

<table>
<thead>
<tr>
<th>Functional category</th>
<th>General HbA1c target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functionally independent</td>
<td>7.0 - 7.5% / 53-59 mmol/mol</td>
</tr>
<tr>
<td>Functionally dependent</td>
<td>7.0 – 8.5% / 53-64 mmol/mol</td>
</tr>
<tr>
<td>Frail</td>
<td>Up to 8.5% / 70 mmol/mol</td>
</tr>
<tr>
<td>Dementia</td>
<td>Up to 8.5% / 70 mmol/mol</td>
</tr>
</tbody>
</table>

*Glycaemic targets should be individualised taking into account functional status, comorbidities, especially the presence of established CVD, history and risk of hypoglycaemia and presence of microvascular complications.*

Proposed changes in medication and treatment should be discussed with the patient and their carer. The reasons for changes need to be understood in terms of increased risk of therapy and/or low likelihood of benefit. It is important to respond to falling HbA1c or losing weight by reviewing and reducing diabetic treatments. A low HbA1c is often overlooked as a desirable target but may result in an admission with hypoglycaemia, particularly where HbA1c is <53mmol/mol (7.0%). Consider treatment de-intensification, starting with drugs that carry a risk of hypoglycaemia.

Poor hydration/vital intake and reduced renal function are also important considerations in older people. Food intake and subsequent medication requirement (including insulin dosage) may reduce with changes in personal circumstances, such as transfer of care settings, and comorbidities. Care home residents who have diabetes need specific review and plans put in place; this is an area that may require focus - Diabetes UK guidance is available.

In the older frail adult, preferentially utilise oral regimes with lower hypoglycaemia risk such as metformin and DPP4 inhibitors. Be wary of sulfonylureas and pre-mixed insulins due to higher hypoglycaemia risk especially in those with renal disease. Insulin should not be with-held if deemed the most appropriate therapy/add-on therapy in those with type 2 diabetes however be aware of the increased risk of hypoglycaemia where tight control is not required. Table 2 represents a consensus view from the guideline authors.

Regular testing of blood glucose is required for any patient where hypoglycaemia is a potential risk. Take into consideration changes in dexterity, vision, and the need for third-party assistance with medicines’ administration, particularly injectables, prior to initiation and in ongoing treatment.
<table>
<thead>
<tr>
<th>Medication</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metformin</td>
<td>Effective at reducing blood glucose, low hypo risk, preferred first-line agent</td>
<td>Be aware of sick day guidelines in those with poor hydration/oral intake and/or reduced renal function. Risk of lactic acidosis especially in severe CCF. Reduce if eGFR&lt;45, stop if &lt;30. Be wary in those with recurrent AKI. GI side effects may reduce tolerability.</td>
</tr>
<tr>
<td>Sulfonylureas (SU)</td>
<td>Effective. They are an option for older adults who eat consistently and are able to recognize and treat hypoglycaemia. In the elderly, gliclazide M/R may have lower hypo risk than standard release gliclazide (due to gradual increase in plasma levels) where meal patterns are erratic and appetite is poor. Weight gain less of a concern in frailty. Repaglinide works in a similar manner to SUs, but has to be taken with meals so it can be skipped if meals are skipped, thus avoiding hypoglycaemia.</td>
<td>Hypo risk with all SUs, use with caution in older people - can use gliclazide but avoid long-acting SUs with active metabolites (glimpiride and glibenclamide). Higher risk of hypos when SU added to insulin or in people with CKD. Avoid SUs in functionally dependent older people (moderate to severe frailty) due to high hypo risk and inability to treat/recognise hypos. Regular blood glucose monitoring required.</td>
</tr>
<tr>
<td>Pioglitazone</td>
<td>Effective, low hypo risk. Weight gain less of a concern in frailty</td>
<td>Use hampered by side effects in older people due to increased prevalence of comorbidities. Risk of peripheral oedema - avoid in heart failure, macular oedema; avoid also in people with fracture risk, and a history or risk of bladder cancer.</td>
</tr>
<tr>
<td>DPP4i</td>
<td>Moderately effective, safe, well tolerated (e.g. low GI side-effects), low hypo risk. Preferred alternative or add-on to metformin</td>
<td>Dose reduction required in those with deteriorating renal function for some agents in this group. Note risk of pancreatitis</td>
</tr>
<tr>
<td>Treatment</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>-----------</td>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td>GLP-1 RA</td>
<td>Effective, low hypo risk. Once weekly GLP-1 may be useful in those with administration difficulties. Injectable therapy may be undesirable e.g. due to poor dexterity. Third-party assistance required. Safety and weight loss effects are not beneficial in frailty. GI side effects may lead to dehydration. Therapeutic experience in those aged &gt;75 years is limited and dose adjustments are required for some agents. Not risk of pancreatitis. Cost/benefit considerations need to be weighed up.</td>
<td></td>
</tr>
<tr>
<td>SGLT2i</td>
<td>Effective. Some cardiovascular benefits in people with existing CVD but caution in people with pre-existing low blood pressure. Side effect profile not appropriate in frailty - increased risk of GU infections, diuresis, weight loss. Be aware of sick day guidelines in those with poor hydration/oral intake and/or reduced renal function. Need regular monitoring of kidney function. Avoid in those aged over 65 years due to limited therapeutic experience.</td>
<td></td>
</tr>
<tr>
<td>Basal insulin</td>
<td>Effective, simplest regime to use when insulin is clinically indicated, particularly when a third-party is needed to administer the insulin (e.g. carers or district nurses). Best given in morning in those with overnight/early morning hypo. Shorter profile of NPH insulins may have benefit in reducing overnight hypo. Useful add-on to oral medication. Risk of hypo (though less than other insulin regimes). Hypo risk increased when combined with sulfonylureas - use with caution. Higher risk of hypoglycaemia in CKD. May need dose reduction as appetite/food intake decreases or HbA1c blood sugars settle to avoid hypo. Requires regular blood glucose monitoring.</td>
<td></td>
</tr>
<tr>
<td>Premixed insulin</td>
<td>Fixed dose and time of administration is good for people with regular meal patterns. Fewer injections required than a basal bolus regime, which may be an advantage with third-party administration; simple method of administration in those with post-prandial hyperglycaemia. Higher risk of hypo compared with other insulin regimes, especially in erratic/poor eaters where mismatch can occur. Higher risk of hypo in CKD. Avoid concomitant use of sulfonylureas. Requires more frequent blood glucose monitoring than basal insulin regimes.</td>
<td></td>
</tr>
</tbody>
</table>
http://www.birminghamandsurroundsformulary.nhs.uk/docs/acg/
SUMMARY

• OFTEN FALL OUTSIDE OF THE TYPICAL TIERS OF CARE
• PART OF MDT BUT NO ONE PERSON RESPONSIBLE
• COST NOT ALWAYS IN RELATION TO QUALITY
• DO NOT ROUTINELY EXEMPT FROM QOF
• CONSIDER FRAILTY ASSESSMENT AT EACH ANNUAL REVIEW
• VULNERABLE PEOPLE DOES NOT MAKE THEM FRAIL – BUT IS ONLY ONE STEP AWAY