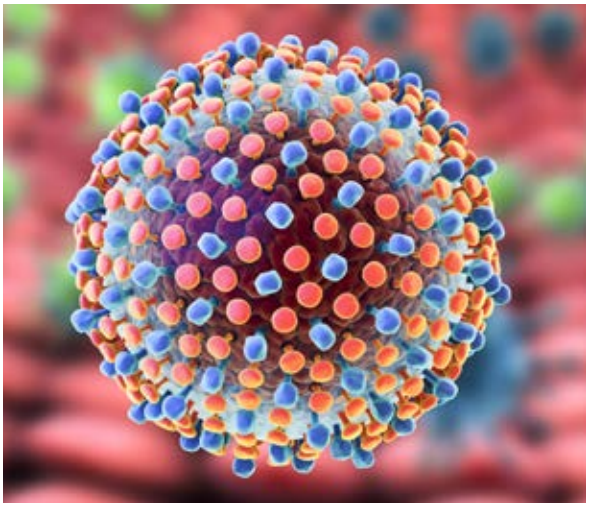
education

FROM THE JOURNALS Edited highlights of weekly research reviews on https://bit.ly/2PLtil8



Hepatitis C: antivirals work, especially for the most sick

How successful are direct acting antiviral treatments in people with chronic hepatitis C virus? This prospective study compared outcomes in patients treated with direct acting antivirals with patients who didn't receive treatment. The treated group showed a drop in all cause mortality and liver cancer, especially in patients who had developed cirrhosis. The authors say that these results support offering treatment to people with the most advanced liver disease because they are the most likely to benefit. However, we still don't know enough about the long term effects of direct acting antivirals that are given to people with less severe disease who are now expected to live a normal lifespan; further follow-up studies would be useful.

Lancet doi:10.1016/S0140-6736(18)32111-1

Unfit army conscripts: how do they shape up?

Are obese and unfit adolescents more likely to be chronically disabled as adults? A Swedish population based study looked at more than a million 16-19 year old young men conscripted between 1972 and 1994. The researchers determined whether the conscripts' cardiorespiratory fitness and body mass index (BMI), which were measured at conscription, correlated with later receipt of a disability pension. Severe obesity in adolescence predicted an increase in disability pension, but being fit was protective whatever the BMI. The study had limitations but it supports the idea that if you're obese and unfit in adolescence, you're at increased risk of chronic disability in later life.

Ann Intern Med doi:10.7326/M18-1861

Ibuprofen to drive down morphine use

How can we reduce the use and misuse of opioid drugs? This clinical trial examines whether a combination of paracetamol 1000 mg and ibuprofen 400 mg or either drug given alone reduces the need for postoperative morphine after total hip arthroplasty? Morphine usage in the first 24 hours was lowest in patients given combined treatment, although the difference in usage between the combination group and the ibuprofen alone group was only 6 mg—lower than the study's predefined minimal clinically relevant difference of 10 mg. Ibuprofen was also shown to be relatively safe; the proportion of patients with serious adverse events was the same (15%) for the ibuprofen plus paracetamol group and ibuprofen alone group compared with 11% for paracetamol alone, which was not statistically significant. On the basis of this study, giving ibuprofen postoperatively seems to be a safe and effective way to reduce the amount of morphine needed after a hip replacement.

JAMA doi:10.1001/jama.2018.22039

E-cigarettes or nicotine replacement for smoking cessation

Are electronic cigarettes better than nicotine replacement therapy if you're trying to stop smoking? At an NHS smoking cessation service 886 people were randomly assigned to nicotine replacement of their choice or an e-cigarette starter pack. Both groups received weekly behavioural support for a month. One year later, 18% remained non-smokers in the e-cigarette group, compared with about 10% in the nicotine replacement group. But abstainers who used e-cigarettes remained reliant on their product; 80% were still vaping daily after a year compared with only 9% of abstainers who used nicotine replacement. It would be helpful to know whether vaping without behavioural support is as effective and how long the effect persists?

NEJM doi:10.1056/NEJMoa1808779

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UNCERTAINTIES

How to prescribe loop diuretics in oedema

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0.5 HOURS

Loop diuretics are commonly prescribed to manage oedema symptoms such as swollen legs or breathlessness and to relieve fluid overload. They are widely recommended by such as the National Institute for Health and Care Excellence (NICE). The loop diuretics available in the UK are furosemide, bumetanide, and torasemide. But which option is best?

The pharmacokinetics of loop diuretics are well characterised. Studies and trials on humans and animals describe pharmacodynamic differences between loop diuretics. However, there is limited evidence directly comparing them. In particular, there is little and low quality information comparing the clinical outcomes of furosemide with the less commonly chosen alternatives torsemide and bumetanide. This article outlines some pharmacokinetic differences between available loop diuretics that may influence loop selection in practice and advises how to dose them effectively.

HOW PATIENTS WERE INVOLVED IN THE CREATION OF THIS ARTICLE

The article was shared with a panel of patients with heart failure, each of whom had extensive experience with diuretics for the treatment of oedema. Their feedback helped to guide subsequent revisions, particularly practical issues regarding patient involvement with as-needed dosing. Their input guided some of the specific phrases suggested for communicating with patients.

WHAT YOU NEED TO KNOW

- Loop diuretics respond in an all-or-none fashion, meaning there is no way to gradually increase or decrease the diuretic effect of these medications; they are either "on" or "off." For a given individual, a dose is either effective or not
- Loop diuretics are widely used for symptoms of oedema of any aetiology
- There is little guidance on which loop diuretic to choose, but moderate strength evidence suggests torsemide may have advantages over furosemide, including higher potency, longer duration of action, and possibly improved symptomatic improvement
- As-needed dosing of loop diuretics may help patients control their volume status while minimising the risk of hypovolaemia and other side effects of loop diuretics

What is the evidence of the uncertainty?

Loop diuretics behave like an on/off switch once they reach their therapeutic threshold, without a gradual change between "fully off" and "fully on".

Evidence of the differences between loops includes systematic reviews, a limited number of head-to-head trials, basic science studies, and pooled data sources. Pharmacology reveals some clinically valuable differences between loops.

Potential advantages of torsemide over furosemide include higher potency, longer duration of action, higher and more predictable bioavailability, lower hospital readmission rates for heart failure, aldosterone inhibition, higher functional/symptomatic improvements, lower rates of cardiac fibrosis than furosemide, less hypokalaemia, and the absence of potentially damaging low thiamine levels.

Bumetanide is less well studied, but a review of loop diuretic pharmacokinetics and comparative safety and efficacy suggests it may have favourable features, similar to those of torsemide, when compared with furosemide.[25] Definitive evidence for differences in quality of life is not available. Furosemide is the most commonly used loop diuretic in the US,[26-28] despite some disadvantages relative to torsemide or bumetanide.

Is ongoing research likely to provide relevant evidence?

Five trials are under way to examine the benefits of various diuretic strategies in the treatment of patients with heart failure (box 1). These studies will advance the science, although future research regarding the clinical implications of various approaches will still be necessary.

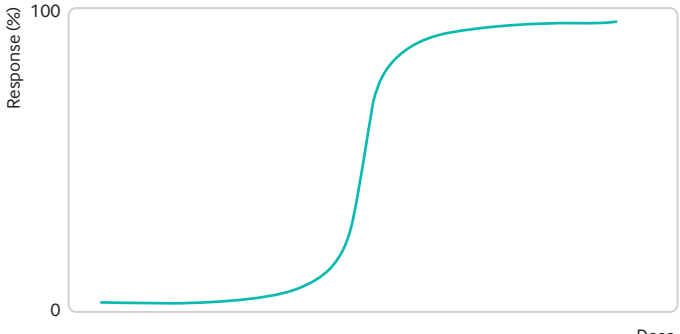
A head-to-head study comparing responsive dosing of the different drugs within the class on clinical outcomes, including those related to patient quality of life, would be helpful for both providers and patients. Outcomes could include hospitalisations for heart failure and hospital-free days at home, patient-reported quality of life assessment, and incidence of electrolyte abnormalities. Ideally, studies would include important subpopulations defined by age, race, ethnicity, and common comorbidities as different patient populations may have different responses to different diuretics. Results of such studies could be useful in the management of patients with oedema, particularly the large number of people with heart failure.

Evidence regarding the effect of patient lifestyle modification on heart failure and diuresis, particularly fluid and sodium restriction, is controversial; patients would likely benefit from further rigorous research quantifying the value of such interventions on important outcomes.

Box 1 | Clinical trials that address some of the uncertainties raised in this article

All trials are currently recruiting

- Comparing standard of care outpatient heart failure management with a weight based torsemide regimen. Clinicaltrials.gov identifier NCT03187509
- Comparing the treatment strategy of torsemide versus furosemide on clinical outcomes over 12 months in patients with heart failure who are hospitalised. Clinicaltrials.gov identifier NCT03296813
- Comparing the effects of torasemide and furosemide on clinical and biochemical parameters of haemodynamic and neurohormonal compensation and myocardial remodelling in patients with chronic heart failure. Clinicaltrials.gov identifier NCT01942109
- Clarifying the factors that contribute to loop-diuretic resistance, and to evaluate the benefit of adding intravenous chlorothiazide to loop-diuretic dosing Clinicaltrials.gov identifier NCT02546583
- Evaluating the safety and efficacy of loop and thiazide diuretics used in combination for patients with acute decompensated heart failure. Clinicaltrials.gov identifier NCT01647932



Dose-response curve (logarithmic) for loop diuretics. For a given individual, any dose above the therapeutic threshold will result in maximal diuresis. Adapted from Brater 1998[1] and Brater 2011[2]

Box 2 | Equivalent doses of loop diuretics

80 mg PO furosemide ≈ 40 mg IV furosemide ≈ 40 mg PO or IV torsemide ≈ 1 mg PO or IV bumetanide ≈ 100 mg PO or IV ethacrynic acid diuretics

Box 3 | Common myths about loop diuretics

- *Myth* Avoid oral diuretics in oedematous patients, because absorption is compromised

Fact Absorption may be slower with oedema, but the overall dose absorbed and the diuretic effect is essentially the same with or without intestinal oedema[2]

- *Myth* Do not use loop diuretics in patients with a sulfa allergy

Fact All loop diuretics except ethacrynic acid contain a sulfa moiety. However, many patients with allergies to sulfonamide antibiotics are *not* allergic to loops.[33] Thus antibiotic sulfa allergy should *not* be considered an absolute contraindication to loop diuretics

- *Myth* Intravenous drip is more effective than bolus dosing for severe oedema

Fact The largest trial comparing bolus dosing with continuous infusion in heart failure showed no difference in any measured outcome.[34] A meta-analysis of 10 trials drew the same conclusion.[35] One review suggested infusion may be beneficial despite lack of evidence[36]

- *Myth* Stop diuresis if creatinine is rising

Fact Some increase in blood urea nitrogen/urea and creatinine may be unavoidable, or even an indication of effective diuresis. An observational substudy of the ESCAPE trial found aggressive diuresis causing haemoconcentration positively correlated with a statistically significant 180 day mortality benefit[37]

What should we do in the light of the uncertainty?

Select a loop diuretic

There is limited guidance on which diuretic to use for patients with oedema. The UK NICE guidance on management of oedema in heart failure, for example, does not direct clinicians to select one loop diuretic over another. Our recommendation is based on our expert opinion and derived from the well described pharmacodynamics of loop diuretics. With any loop diuretic, monitor electrolytes and renal function routinely and when dose or symptom changes.

Consider starting with torsemide as the loop of choice depending on local formulary; a typical starting dose is 10-20 mg in clinical practice, although some authorities recommend starting lower [29-31] which can be adjusted depending on patient response.

Consider bumetanide when minimising fluid infusion is critical, since intravenous formulations of bumetanide are 40 times more concentrated than the equivalent furosemide dose (box 2).[32] Ethacrynic acid, which has high potential for ototoxicity, is usually reserved for patients with a documented allergy to diuretics containing sulfa (box 3).

Determine if the dose is working

To determine if the chosen loop dose is working, ask about the patient's response to the diuretic: "When you take the medication, what do you notice regarding how much you urinate? How long does that effect last?" If the dose is therapeutic, frequent urination should occur in the 4-6 hours immediately following ingestion; the urine volume can be as high as 2000-4000 mL during that period.[2 38] Within that 4-6 hour window, torsemide has the longest duration of action, bumetanide the shortest, and furosemide is intermediate.[2]

A higher dose of loop diuretic, above the threshold, will not lead to greater diuresis.[39 40] If the dose is below the patient's therapeutic threshold, urine output will not change substantially in response to the drug.[38]

If there is no short term increase in urine output, or if patients report polyuria unrelated to dosing ("I pee all day and all night"), the dose is likely to be subtherapeutic and should be increased until the diuretic threshold is reached. Diuresis caused by a loop diuretic (frequent urination for 4-6 hours) is distinct from the frequent urination caused by hypervolaemia, where excess fluid chronically fills the intravascular space and causes continuous polyuria, often worse at night when lying down. Nocturia typically indicates ineffective daytime diuresis, not excessive diuretic response.[41 42]

As needed, dry weight dosing of loop diuretics

After an effective regimen is started, hypervolaemia will resolve and the patient will move towards euvolaemia. Diuretics continued consistently, after euvolaemia is achieved, can cause hypovolaemia. Once euvolaemia is achieved using the patient's therapeutic dose, we suggest using an as-needed dose of diuretic based on dry weight. Avoid common dosing errors (box 4).

Based on the evidence, an understanding of the pharmacokinetics of loop diuretics, and our practice experience, we recommend "as-needed dosing." This potentially reduces several problems, including the risks of

Box 4 | Common errors in loop diuretic use

- Prescribing multiple, different daily doses ("Take 40 mg in the morning and 20 mg at night"). Instead, find a dose that works, and use only that dose; avoid subtherapeutic doses
- Prescribing variable doses ("Take 20 mg a day, make that 40 mg if you're very oedematous") Instead find a dose that works, and use only that dose
- Increasing doses that are already effective ("You're still oedematous, even though that 40 mg dose is working. Take 80 mg for a few days"). Once the switch is on, you can't turn it up
- Using subtherapeutic doses to achieve "gentle diuresis" or to "save the kidneys." ("That 40 mg dose isn't doing anything, take it twice daily.") Keeping a switch in the off position has no effect, and is essentially a placebo

over- and under-diuresis. Use of diuretics can be triggered by weight gain or by specific symptoms. Weight gain can serve as an early indicator of fluid retention. Daily weighing is recommended in most guidelines, including the Scottish,[43] American,[44] and European guidelines on managing heart failure,[45] although to date no trials have shown that daily weights improve outcomes.[46] This approach is effective for most patients, but does require them to self-manage: checking their weight daily and making medication decisions based on that weight. Patients who have the ability and desire to follow a weight or symptom based dosing regimen, or those who have adequate support in making these decisions, should be selected. Follow up in clinic or by phone to assess symptom resolution for safe implementation of this strategy.

Visible oedema or shortness of breath can be used as triggers for treatment; this may be useful in patients who develop symptomatic oedema without previous weight gain.[47 48]

Competing interests: None declared.

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Find the full version with references at http://dx.doi.org/10.1136/bmj.l359

EDUCATION INTO PRACTICE

- How do you think your patients would manage as-needed dry weight dosing? What support or information could you offer them to help with this approach?
- Project: how many of your patients with heart failure are on variable doses of loop diuretics as outlined in this article?
- How do you assess whether a diuretic is working? For example, do you assess the therapeutic threshold through urine output when commencing loop diuretics?

HOW THIS ARTICLE WAS CREATED

We initially wrote this article in response to questions primary care clinicians frequently posed when seeking assistance in managing oedema in patients with heart failure. Evidence was gathered over a 15 year period in response to patient and physician queries regarding the management of oedema and the use of loop diuretics. We used PubMed as the primary search resource; and reviewed text books. Search terms varied depending on the queries addressed, and included: "furosemide," "torsemide," "bumetanide," "loop diuretic(s)," "diuresis," "heart failure," "threshold," "pharmacokinetics," and "pharmacodynamics."

We searched the International Clinical Trials Registry Platform,[59] the metaRegister of Controlled Trials,[60] and the US Clinical Trials Register[61] in July 2018 using the search terms "furosemide," "torsemide," and "bumetanide."

WHAT YOUR PATIENT IS THINKING

I welcomed the inane chatter during a procedure

Rhiannon De Wreede recalls the importance of inane chatter and encouragement while going through an uncomfortable procedure

WHAT YOU NEED TO KNOW

- Sometimes saying anything is better than saying nothing
- Inane chatter can be a distraction tool that can make better a difficult or challenging experience
- Encouragement may help patients believe they will do better

CPD READING
0.5 HOURS

I have just had my coil changed. The first one was fitted five years ago and because of a routine smear the "mystery of the missing threads" was discovered. After several attempts from healthcare professionals to find them and some ultrasound scans the problem was still unresolved. So, I booked an appointment at a sexual health clinic to have the coil removed. I was nervous and didn't know what to expect.

Entering the office, we had small talk about how my "womb was on the big side." I translated this new knowledge of my body into my own words—I now had a "cavernous uterus." They reassured me that this didn't mean anything, other than the doctor might have to "roam around a bit."

With my nether regions exposed and legs akimbo the procedure began. The health professional next to me was doing a fantastic job, holding my hand and talking incessantly. I needed this.

Talk about anything else

During the procedure they checked—did I need more anaesthetic? In between sweating, panting, and wincing I said, "Yes please." Trying to remain polite despite my discomfort. On the outside we are discussing my girl's name "Yes we called our girl Dylan. It is unusual," I can hear myself saying. At the same

The chat could have been on space abductions for all I cared. But it was there and that's what mattered

ROSE LLOYD

time, all I am thinking on the inside is "Where are those threads? What are they doing? When will this be over?" We continue talking about anything else, including my luck at finding a parking space.

The health professional asked "Do you want to take your jumper off?" We hauled my ridiculously thick jumper over my head without disturbing the business end. "Little bit more anaesthetic?" they asked. We've come this far I thought "Go on then." I think the conversation was on Christmas at this point, it was difficult to keep track. It could have been on space abductions for all I cared. But it was there and that's what mattered.

In it together

They continued with no luck. Leaning back the clinician looked up at me from between my legs. I wondered if she was trying not to show her frustration. They asked whether I wanted to stop the procedure—"I'll book you in for removal under general anaesthetic?" The idea had merit. But in that moment, all I could see was the saga stretching out and I wanted it over, today. I asked them to give me a minute and then to try again. Both healthcare professionals supplied a constant stream of encouragement, which helped me to find the strength to go on.

I like to think we all breathed deeply, another rummage for minute or so and . . . victory. The health team high fived me and we held a mini celebration, well half of me did, my legs were still spread. "Shall I pop the other one in now?" I'd forgotten about that part. I agreed and barely felt a thing. We had won.

Distraction and relaxant

Recovery involved letting my legs down and lying there chatting about more stuff that didn't matter but was very important. I took the tea offered and sat in the waiting room willing the pain relief to work. What did I make of the whole thing? It was certainly an experience. Could I have done without it? Yes, of course. But now I can go another 5 years without worrying about it . . . every cloud.

The conversations we had were a vital part of the experience, as a distraction and as a relaxant. The babble of usual topics in an unusual situation relaxed me and made the whole thing much easier.

Twitter @DrRhideWreede

Competing interests: None declared.

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EDUCATION INTO PRACTICE

- What do you typically say or do to help people through uncomfortable procedures?
- How and why might you modify your approach?
- How does conversation differ, depending on whether you are alone, or have someone to assist you?

These questions were developed by the editors and reviewed by the patient author

There was a constant stream of encouragement, which helped me to find the strength to go on

How to use data for quality improvement

Amar Shah outlines the data needed to understand quality of care, what data to capture to check that care is improving, how to interpret the data, and offers some tips for doing this more effectively

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We all need a way to understand the quality of care we are providing, or receiving, and how our service is performing. Data are used to make judgments, to answer questions, and to monitor and support improvement in healthcare. The same data can be used in different ways, depending on what we want to know or learn. Within healthcare, we use a range of data at different levels of the system: patient level, service level, organisation level, and population level.

Defining quality improvement[2]

Quality improvement aims to make a difference to patients by improving safety, effectiveness, and experience of care by

1 Using understanding of our complex healthcare environment

2 Applying a systematic approach

3 Designing, testing, and implementing changes using real time measurement for improvement

WHAT YOU NEED TO KNOW

- Both qualitative and quantitative data are critical for evaluating and guiding improvement
- A family of measures, incorporating outcome, process, and balancing measures, should be used to track improvement work
- Time series analysis, using small amounts of data collected and displayed frequently, is the gold standard for using data for improvement

CPD READING
0.5 HOURS

What data do we need?

Healthcare is a complex system, with multiple interdependencies and an array of factors influencing outcomes. Complex systems are open, unpredictable, and continually adapting to their environment.[3] No single source of data can help us understand how a complex system behaves, so we need several data sources to see how a complex system in healthcare is performing.

When trying to understand quality within a complex system, we need to look at a mix of outcomes (what matters to patients), processes (the way we do our work), and structures (resources, equipment, governance, etc).

Therefore, when we are trying to improve something, we need a small number of measures (ideally 5-8) to help us monitor whether we are moving towards our goal. Any improvement effort should include outcome measures linked explicitly to the aim of the work, process measures that show how we are doing with the things we are changing to help us achieve our aim, and one or two balancing measures. Balancing measures help us spot unintended consequences of the changes we are making. As complex systems are unpredictable, our new changes may result in an unexpected adverse effect. Balancing measures help us stay alert to these, and ought to be things that are already collected, so that we do not waste extra resources.

Different types of measures of quality of care

Outcome measures (linked explicitly to the aim of the project)

Aim—To reduce waiting times from referral to appointment in a clinic

Outcome measure—Length of time from referral being made to being seen in clinic

***Data collection*—Date when each referral was made, and date when each referral was seen in clinic, in order to calculate the time in days from referral to being seen**

Process measures (linked to the things you are going to work on to achieve the aim)

Change idea—Use of a new referral form (to reduce numbers of inappropriate referrals and re-work in obtaining necessary information)

Process measure—Percentage of referrals received that are inappropriate or require further information

***Data collection*—Number of referrals received that are inappropriate or require further information each week divided by total number of referrals received each week**

Balancing measures (to spot unintended consequences)

Measure—Percentage of referrers who are satisfied or very satisfied with the referral process (to spot whether all these changes are having a detrimental effect on the experience of those being referred to us)

***Data collection*—A monthly survey of referrers to assess their satisfaction with the referral process**

Measure—Percentage of staff who are satisfied or very satisfied at work (to spot whether the changes are increasing burden on staff and reducing their satisfaction at work)

***Data collection*—A monthly survey for staff to assess their satisfaction at work**

How should we look at the data?

This depends on the question we are trying to answer. If we ask whether an intervention was efficacious, as we might in a research study, we would need to be able to compare data before and after the intervention and remove all potential confounders and bias.

This approach is unlikely to be possible in most contexts where we are trying to improve quality. Most of the time when we are improving a service, we are making multiple changes and assessing impact in real time, without being able to remove all confounding factors and potential bias. When we ask whether an outcome has improved, we need to be able to look at data over time to see how the system changes as we intervene. When looking at a quality issue from an improvement perspective, we view smaller amounts of data but more frequently to see if we are improving over time.[2]

What is best practice in using data to support improvement?

Best practice would be for each team to have a small number of measures that are collectively agreed with service users as being the most important ways of understanding the quality of the service being provided. These measures would be displayed transparently so that all staff, service users, and patients and families or carers can access them and understand how the service is performing. The data would be shown as time series analysis, to provide a visual display of whether the service is improving over time. The data should be available as close to real time as possible, ideally on a daily or weekly basis. The data prompt discussion and action, with the team reviewing the data regularly, identifying any signals that suggest something unusual in the data, and taking action as necessary.

The main tools to display data are the run chart and the Shewhart (or control) chart. The run chart (fig 1) is a graphic display of data in time order, with a median value, and uses probability based rules to help identify whether the variation seen is random or non-random.[2] The Shewhart (control) chart (fig 2) also displays data in time order, but with a mean as the centre line instead of a median, and upper and lower control limits (UCL and LCL) defining the boundaries within which you would predict the data to be.[6] Shewhart charts use the terms "common cause variation" and "special cause variation," with a different set of rules to identify special causes.

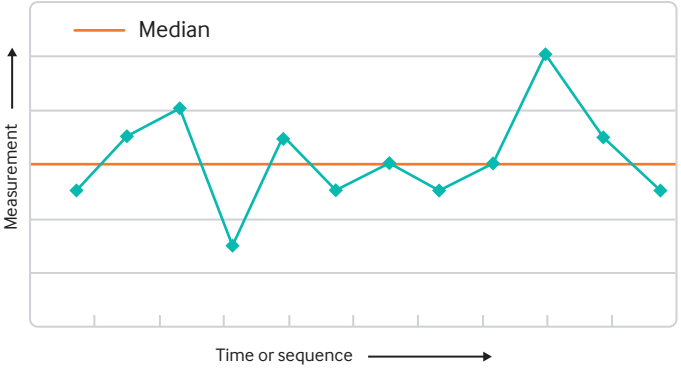
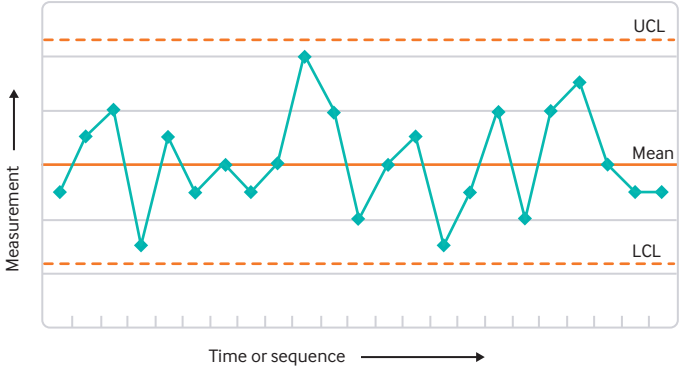


Fig 1 | A typical run chart



UCL = Upper control limit, LCL = Lower control limit

Fig 2 | A typical Shewhart (or control) chart

Different ways to collect qualitative data for improvement

Data collection method	Advantages	Disadvantages	Using the data
Free text question in a survey	Quick and easy to create, on paper or electronic	Questions are pre-determined so cannot adapt based on answers Beware of survey fatigue	At the start of a project to capture opinions, ideas, and feedback from service users and staff
Interviews	Can be individual or group Can be structured, semi-structured, or unstructured Can explore deeper meaning	Time intensive Need to facilitate the interview and take notes or record the discussion Analysing large amounts of narrative requires skill	To help us understand the issue we want to work on in more detail with multiple perspectives To help us appreciate a deeper meaning behind people's views and theories
Observations	Able to see behaviour and impact of human factors in real world setting Can be useful in understanding robustness of implementation	Time intensive Obtrusive, so risk of Hawthorne (observer) effect—knowing you are being observed affects how you behave	Useful to understand the system from another perspective Can be particularly helpful in monitoring whether implementation has been successful
Review of documents	Large amounts of documentation are usually available, and may yield useful information (such as complaints, incident forms, clinical documentation)	Can be time intensive May need a defined search and sampling strategy—you could ask your informatics or business intelligence team for help	At start of project to identify opportunities for improvement through analysing service user feedback, incidents. or complaints

Fig 3| Example of a safety cross in use

Is it just about numbers?

We need to incorporate both qualitative and quantitative data to help us learn about how the system is performing and to see if we improve over time. Qualitative data are virtually any type of information that can be observed and recorded that is not numerical in nature. Qualitative data are particularly useful in helping us to gain deeper insight into an issue, and to understand meaning, opinion, and feelings. This is vital in supporting us to develop theories about what to focus on and what might make a difference.[7] Examples of qualitative data include waiting room observation, feedback about experience of care, free text responses to a survey.

Using qualitative data for improvement

One key point in an improvement journey when qualitative data are critical is at the start, when trying to identify "What matters most?" The other key time to use qualitative data is during "Plan, Do, Study, Act" (PDSA) cycles. Most PDSA cycles, when done well, rely on qualitative data as well as quantitative data to help learn about how the test fared compared with our original theory and prediction.

The table shows four different ways to collect qualitative data, with advantages and disadvantages of each, and how we might use them within our improvement work.

Tips to overcome common challenges in using data for improvement

One of the key challenges faced by healthcare teams across the globe is being able to access data that are routinely collected, in order to use them for improvement. Large volumes of data are collected in healthcare, but often little is available to staff or service users in a timescale or in a form that allows them to be useful for improvement. One way to work around this is to have a simple form of measurement on the unit, clinic, or ward that the team own and update. This could be in the form of a safety cross[8] or tally chart. A safety cross (fig 3) is a simple visual monthly calendar on the wall which allows teams to identify when a safety event (such as a fall) occurred on the ward. The team simply colours in each day green when no fall occurred, or colours in red the days when a fall occurred. It allows the team to own the data related to a safety event that they care about and easily see how many events are occurring over a month. Being able to see such data transparently on a ward allows teams to update data in real time and be able to respond to them effectively.

A common challenge in using qualitative data is being able to analyse large quantities of text. There are formal approaches to qualitative data analyses, but most healthcare staff are not trained in these methods. Key tips are (*a*) to be intentional with your search and sampling strategy so that you collect only the minimum amount of data that are likely to be useful for learning and (*b*) to use simple ways to read and theme the data in order to extract useful information to guide your improvement work.[9] See if you can find someone in your organisation with qualitative data analysis skills, such as clinical psychologists or the patient experience or informatics teams.

Competing interests: None declared.

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EDUCATION INTO PRACTICE

- What are the key measures for the service that you work in?
- Are these measures available, transparently displayed, and viewed over time?
- What qualitative data do you use in helping guide your improvement efforts?

HOW PATIENTS WERE INVOLVED IN THE CREATION OF THIS ARTICLE

Service users are deeply involved in all quality improvement work at East London NHS Foundation Trust, including within the training programmes we deliver. Shared learning over many years has contributed to our understanding of how best to use all types of data to support improvement. No patients have had input specifically into this article.

CASE REVIEW

A 61 year old man with pancreatitis, pituitary dysfunction, and painful exophthalmos

A 61 year old man with several years' history of chronic pancreatitis and complex partial seizures was referred to endocrinology with low serum thyroid stimulating hormone (TSH).

At the time, examination was normal, and pituitary function tests revealed secondary hypothyroidism and secondary hypogonadism with normal prolactin and normal 9 am cortisol.

Magnetic resonance imaging (MRI) of the pituitary gland showed an 8 mm infundibular mass with elevation, but not compression of the optic chiasm. Thyroxine and testosterone replacement were commenced.

His condition was stable for three years, after which he presented with an acute flare of pancreatitis, associated with painful, bilateral exophthalmos (figure). He was clinically and biochemically euthyroid on thyroxine replacement. Repeat MRI showed an increase in the size of the infundibular mass, and bilateral extra-ocular muscle expansion with lacrimal gland swelling.

1 What is the most likely unifying diagnosis?

2 What is the definitive investigation to diagnose this condition?

3 How would you manage this condition?

Submitted by Christopher Smith, Saira Hameed, Geoffrey E Rose, and Florian Wernig

Patient consent obtained.

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If you would like to write a Case Review or Spot Diagnosis for Endgames, please see our author guidelines athttp://bit.ly/29HCBAL and submit online at http://bit.ly/29yyGSx

answers

For extra material, including patient outcome, go to bmj.com/endgames

CASE REVIEW

A 61 year old man with pancreatitis, pituitary dysfunction, and painful exophthalmos

1 What is the most likely unifying diagnosis?

This patient's multiple pathologies (pituitary gland mass, exophthalmos, dacryoadenitis, chronic pancreatitis, and seizures) are suggestive of IgG4 related disease.

Consider IgG4 related disease with any combination of multi-organ inflammation, including pancreatic, ocular, pituitary, salivary gland and retroperitoneal fibrosis.

Typically, patients are male and over 40, and onset is subacute and insidious.

Patients may present to different specialists with a variety of symptoms.

2 What is the definitive investigation to diagnose this condition?

Tissue biopsy with immunostaining for IgG4 positive plasma cells is the gold standard investigation. Supportive tests include biochemical and radiological investigation of affected organs.

3 How would you manage this condition?

Glucocorticoids are the recommended first line treatment. They have been shown to achieve remission induction in many cases.

Consider steroid sparing agents (eg, rituximab, azathioprine, mycophenolate mofetil, and methotrexate) for potential side effects of long term steroid treatment.

Offer multidisciplinary team input for managing the long term multi-system sequelae.

Treatment strategies for remission maintenance and second line immunosuppression vary.

Relapse is common.

PATIENT OUTCOME

Lacrimal gland biopsy confirmed the diagnosis of IgG4 related disease. (Histology showed eosinophilic angiocentric fibrosis and marked infiltration with IgG4 positive plasma cells.)

There was rapid improvement in proptosis and chronic pancreatitis (steatorrhoea) after starting 60 mg prednisolone daily, and there was reduction in the size of the pituitary mass. The patient developed steroid induced diabetes and required insulin treatment. The patient was weaned off prednisolone and remained in complete remission for three years before re-presenting with acute pancreatitis. A second course of systemic glucocorticoids controlled the condition, but 14 months after glucocorticoid cessation the disease relapsed again, this time with painful proptosis and a substantial increase in the size of the pituitary stalk mass. Remission was achieved on a third course of steroids and he remains on long term low dose prednisolone.

CPD READING 0.5 HOURS

You can record CPD points for reading any article. We suggest half an hour to read and reflect on each.

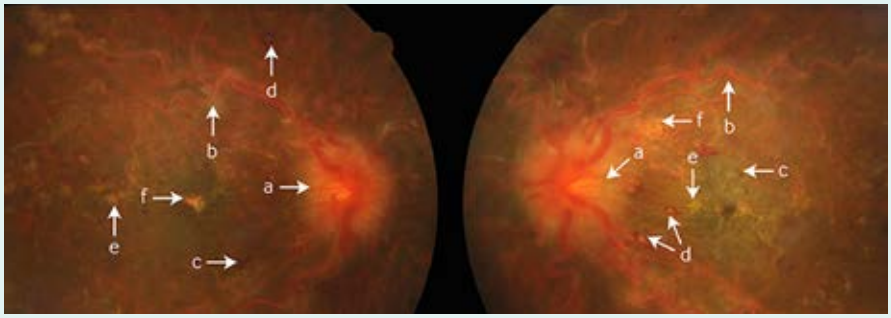
LEARNING MODULE

Articles with a "learning module" logo have a linked BMJ Learning module at http://learning.bmj.com.

Bilateral central retinal vein occlusion as the first manifestation in chronic myeloid leukaemia

A previously well 20 year old woman described bilateral acute onset blurred vision for two weeks. Visual acuity was 20/400 (right eye) and 20/200 (left eye). Funduscopy (figure) showed bilateral central retinal vein occlusion with optic disc swelling (a), diffuse engorged corkscrew vessels (b), scattered retinal haemorrhage (c), Roth's spots (d), hard exudates (e), and cotton wool spots (f). Laboratory data showed leucocytosis with dominant myelocytes. Bone marrow analysis showed chronic myeloid leukaemia.

Bilateral central retinal vein occlusion is a rare presentation of chronic myeloid leukaemia. It is thought that hyperviscosity caused by chronic myeloid leukaemia may contribute to blood stagnation in the central retinal vein, increasing venous resistance and pressure, and giving rise to central retinal vein occlusion.



After one year of treatment with a tyrosine kinase inhibitor, visual acuity was 20/25 in both eyes.

Weidar Chen; Cih-En Huang; Chien-Hsiung Lai, Chang Gung Memorial Hospital, Chaiyi, Taiwan; Evelyn Jou Chen Huang (roro691213@gmail.com), College of Medicine, Taipei Medical University, Taipei, Taiwan

Patient consent obtained.

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If you would like to write a Minerva picture case, please see our author guidelines at http://bit.ly/29HCBAL and submit online at http://bit.ly/29yyGSx

Space flight

Minerva sometimes wonders if success in solving the technical challenges of space flight hasn't diverted attention from examining the problems of the human body in adapting to conditions of microgravity. Diffusion magnetic resonance imaging data collected from 26 astronauts before and after space missions show an increase in brain free water and extensive changes in white matter (*JAMA Neurol*). At the moment, the long term consequences are anyone's guess, but if you were planning a trip to Mars, you'd want to know whether these changes stabilised or progressed.

Remission of type 2 diabetes

Around three quarters of people with obesity and type 2 diabetes will experience remission in the first year after Roux-en-Y gastric bypass surgery, according to a follow-up study of more than 1000 people from Denmark. In comparison with a group matched for age, sex, and duration of diabetes who did not receive bariatric surgery, the risk of microvascular complications was halved (*Diabetologia*). However, this was not a randomised comparison and no individual level data on body mass index were available.

Psoriasis and body mass index

Several observational studies have shown a link between obesity and psoriasis. Is this a causal relation and, if so, in which direction is it operating? Although obesity might promote skin inflammation, it's also possible that skin disease deters people from taking part in physical activity and leads to weight gain. A series of mendelian randomisation studies have discovered that genetic variants associated with obesity are also associated with psoriasis—but not the other way around. This suggests that obesity does contribute to the pathogenesis of psoriasis and that interventions that achieve weight loss are likely to be worthwhile (*PLoS Med*).

Dealing with uncertainty

A questionnaire study of doctors working in emergency departments finds that more experienced clinicians are better at tolerating uncertainty and are less risk averse in their decision making than their junior colleagues (*BMJ Qual Saf* doi:10.1136/bmjqs-2018-008390). Although this isn't surprising, it echoes a recent essay which argued that a revolution in the acceptance of uncertainty is the only way forward for doctors, patients, and healthcare systems (*N Engl J Med*). Inability to deal with clinical uncertainty is expensive and harmful because it leads to over-investigation. Striving to achieve certainty risks premature closure of diagnostic options and medical error.

Accelerometers

An analysis of data from 80 000 participants in the UK Biobank study finds that higher levels of physical activity are associated with lower adiposity whether measured by body mass index, percentage body fat, or waist circumference (*BMJ Open*). These associations were twice as strong when activity was measured by accelerometers instead of estimated from self report. Discrepancies between the two methods varied with body mass index, which suggests that people with higher adiposity are less accurate in assessing how much activity they take.

Cite this as: *BMJ* 2019;364:l703