



Virtual fracture liaison clinics in the COVID era: an initiative to maintain fracture prevention services during the pandemic associated with positive patient experience

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Abstract

Summary We introduced virtual fracture liaison clinics during the COVID-19 pandemic in order to support clinical care while DXA services were down-turned. We observed that virtual FLS clinics are effective in delivering fracture risk assessment, health promotion, and clinical management and are well received by patients with positive patient experience.

Introduction We examined the impact of virtual FLS telephone clinics, as an alternative to face-to-face clinics during the COVID-19 lockdown.

Methods Patients presenting with low trauma fracture were recruited according to standard criteria. A structured telephone clinic appointment was offered, which included fracture risk and health promotion assessment and a treatment plan. Risk factors, demographics, fracture type, FRAX scores, and outcomes were analysed. We assessed patient experience with an anonymised patient survey.

Results Clinical outcomes from virtual clinics were assessed (77F/33M; mean age 65.7 years). The mean 10-year observed fracture risk for major osteoporotic fracture was 18.2% and 7.0% for hip fracture. We observed high ‘attendance’ rates at 79%; however, a significant number were still not available for telephone review (11%) or cancelled their appointment (10%). A recommendation for bisphosphonate treatment was made in 54% of the cohort based on National Osteoporosis Guidelines Group (NOGG) criteria. Follow-up DXA assessment is planned for 64%, according to fracture risk and NOGG guidance. We received 60 responses from the initial patient survey. Ninety percent rated their overall experience of service at 4 or 5 (very good to excellent). Ninety-eight indicated they would recommend the service to others.

Conclusions Virtual clinics are effective in delivery of fracture risk assessment and clinical management with positive patient experience. While a significant proportion will require DXA follow-up to complete the clinical assessment, virtual clinics have mitigated delays in fracture prevention interventions during the COVID-19 pandemic.

Keywords Fracture · Identification · Osteoporosis · Virtual

Introduction

Fracture liaison services (FLS) are clinically and cost-effective for fracture prevention [1]. During the COVID-19 pandemic, routine outpatient clinics and dual X-ray absorptiometry (DXA) services were closed in many areas of the UK. As a result, FLS services ceased in some areas,

due to lack of DXA access and in some cases due to staff redeployment.

At an early stage in the pandemic, we set a goal to try to maintain business as usual, where possible, to support our patients and to try to reduce the impact on fracture services by continuing secondary fracture prevention clinics during the pandemic.

We already had some experience in delivering virtual telephone clinics for assessment of medication concordance [1]. Our goal was to ensure that patients presenting with fragility fracture were offered an opportunity for fracture risk assessment and to provide health promotion advice and intervention with fracture prevention treatments according to National Osteoporosis Guidelines Group (NOGG) recommendations [2].

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We examined the impact of provision of virtual FLS telephone clinics, as an alternative to face-to-face clinics during the lockdown using established approaches for fracture risk assessment and secondary fracture prevention [1, 2]. We also sought to explore patient experience of virtual clinic delivery.

Methods

Patients presenting with low trauma fracture were recruited according to standard criteria [1]. Our face-to-face one-stop FLS service was suspended during the initial 1st phase of the COVID pandemic, with closure of DXA services, to minimise foot fall. The multi-disciplinary team promptly responded to this unprecedented public health crisis by re-designing our FLS clinics to a virtual format until face-to-face clinics could safely resume. An approximate 3–4-week lead time was needed to arrange virtual clinics with the booking office teams and to agree to new clinical management pathways.

A structured telephone clinic appointment was offered to those aged ≥ 50 –80 years, which included fracture risk and health promotion assessment and a treatment plan. The outpatient booking office provided a written invitation to respond to the offer of a new patient appointment. Patients who responded were then booked according to agreed “partial booking systems”, followed by a text reminder system. We did not actively exclude patients with hearing loss and/or cognitive impairment, and a telephone consultation would still have been attempted. Service users will have had an opportunity to respond to the clinic invitation letter, and for those with hearing impairment, there will have been an opportunity to involve a family member to assist. One patient utilised the relay UK hearing service, and the call was a success. For those with cognitive impairment, a relative/carer would ordinarily have taken the call alongside the patient with the consent of the patient. If the virtual assessment could not safely proceed, patients were booked for face-to-face assessment and DXA when normal services resumed.

We used FRAX to conduct a comprehensive risk assessment to support decision-making around secondary fracture prevention in the virtual FLS setting given the absence of face-to-face services and DXA scanning availability [2]. FRAX scores were calculated based on the patients’ self-reported height and weight. In the event that patients were unable to provide these details, they were booked for future face-to-face assessment and DXA. A treatment recommendation was then communicated to the primary care clinician and patient to consider intervention where appropriate. A follow-up DXA scan was requested for those falling into the intermediate or high-risk assessment category.

The Belfast FLS service provides trauma services for the Greater Belfast Area and wider region. Our estimated case load from the national hip fracture database is 451 hip

fractures per year with an estimated fragility fracture incidence of 2225 annually.

We reviewed outcomes from the first 100 patients who were booked for virtual clinics. Risk factors, demographics, fracture type, FRAX scores, and outcomes were analysed [2]. We also assessed patient experience with an anonymised patient survey, with a rating scale of 1–5 (from poor to excellent) to describe their experience of the virtual FLS service.

Students’ *t* tests and Chi-square tests were used to compare differences in means and proportions, respectively, for clinical variables including FRAX scores and between groups for those who attended for DXA or not. Statistical significance was defined as a two-tailed *p* value of ≤ 0.05 . All statistical analyses were undertaken on Microsoft Excel (2016).

Results

FLS outcomes were reviewed in 77 women and 33 men who attended virtual FLS assessment (mean age 65.7 years) following fragility fracture (hip, $n=20$; spine, $n=11$; non-hip/non-spine, $n=69$) (Table 1). We observed high ‘attendance’ rates at 79%; however, a significant number of patients booked for clinic were not available for telephone review (11%) or cancelled their appointment (10%). Virtual FLS assessment was undertaken at a median of 4.4 months from the time of a diagnostic radiology report.

The mean 10-year observed fracture risk for major osteoporotic fracture was 18.2% and 7.0% for hip fracture. Current smoking status (30%), parental hip fracture (16%), and secondary causes (16%) were reported most frequently. 36/100 had previously sustained a prior fracture. Steroid use (5%), rheumatoid arthritis (3%), excess alcohol (10%), and prior falls (23%) were also reported as risk factors.

Co-morbidities including early menopause (22%), height loss (6%), family history of osteoporosis (12%), anticonvulsant therapy (1%), chronic liver disease (1%), prior Cushing’s syndrome (1%), aromatase inhibitor usage (2%), and malabsorption or inflammatory bowel disease (3%) were reported.

A recommendation for bisphosphonate was identified in 54% of the cohort based on NOGG criteria. Treatment with calcium and/or vitamin D was recommended in a majority of cases (90%) alongside health promotion recommendations for falls prevention (97%) and lifestyle management (98%) (Fig. 1).

Follow-up DXA assessment was planned for 64/100, following FRAX assessment and according to the NOGG guidance recommendation. Subsequently, by mid-October 2020, 50 patients had attended for follow-up DXA, 3 declined assessment, 4 failed to attend, and one patient died during follow-up; the remainder are still pending a scan with delays arising from reduced DXA capacity during the pandemic.

Table 1 Clinical characteristics of individuals attending virtual FLS service

Gender	77 women; 33 men
Age (years)	65.7
Fracture location	Hip, <i>n</i> =20 Spine, <i>n</i> =11 Non-hip/non-spine, <i>n</i> =69
Major osteoporotic fracture FRAX score (%)	18.2
Hip FRAX score (%)	7.0
Time interval from fracture to virtual FLS appointment (months; median ± SD)	4.4 ± 1.5
Clinical risk factors (%)	Current smoking status (30), Parental hip fracture (16) Secondary causes (16) Prior fracture (36) Corticosteroid use (5) Rheumatoid arthritis (3) Excess alcohol (10) Prior falls (23)

Clinical characteristics for those who attended DXA versus those who did not were similar, including age 64.1 vs 67.3 years, gender 72% vs 82% female, *p*=0.23, and fracture type (hip 20 vs 22%, non-hip/non-spine 72 vs 72%, *p*=0.7, respectively). There were no significant differences between the baseline FRAX scores for 10-year risk of major osteoporotic (MOF) and for hip fractures between those who attended for DXA (hip 6.5 ± 8.3 %, MOF 17.4 ± 10.0%, *p*=0.32) and those who did not (hip 8.3 ± 8.2 %, MOF 20.3 ± 8.1%, *p*=0.17).

Of those who attended for DXA, 32% fulfilled the WHO criteria for a densitometric diagnosis of osteoporosis, 40% were osteopenic, and 28% had normal bone mineral density (BMD). The median T-score was -1.3 (total hip), -1.6 (femoral neck), and -1.05 (lumbar spine). Corresponding BMD scores were 0.881, 0.818, and 1.081 g/cm².

There was concordance between the virtual FLS recommendation and subsequent outcome after DXA in 31/50, whereas the clinical recommendation following DXA varied in 19/50 cases. In 9/19 cases, a recommendation was made to commence bisphosphonate after DXA.

We received 60 responses from the initial patient survey. Ninety percent rated their overall experience of service at 4 or 5 (very good to excellent). Ninety-eight percent indicated they would recommend the service to others. 33/46 rated the ease of making an appointment by phone as excellent, 3 as very good, 6 as good, and the remainder did not comment. A range of other patient experience outcomes were explored with favourable outcomes (Fig. 2.). 9/60 had previous experience of the FLS service.

20/60 patients responded to a question seeking feedback on how the service could be improved. Themes included requests

Fig. 1 Treatment recommendations from FLS clinic visit

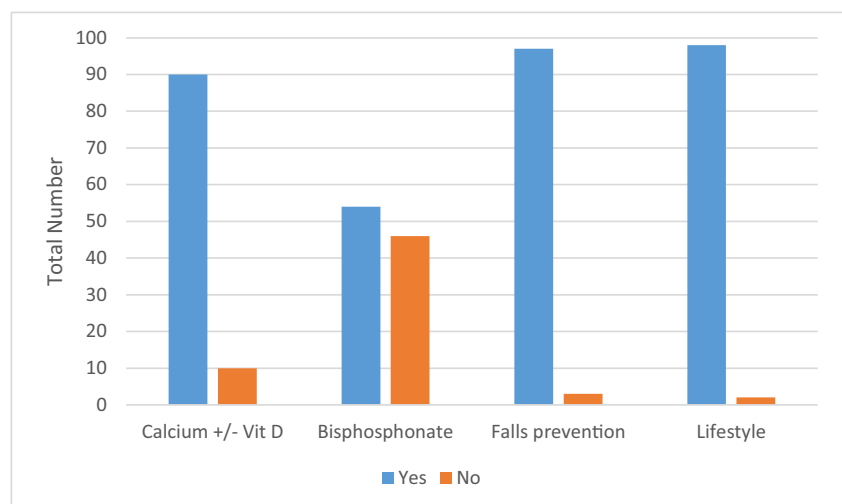
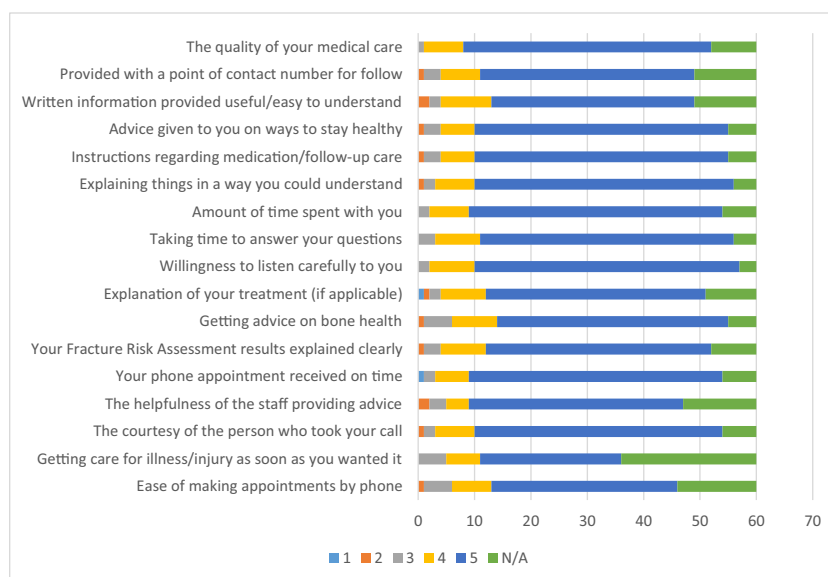


Fig. 2 Results from anonymised patient experience questionnaire. A Likert rating scale ranging 1–5 (from poor to excellent) was used to assess experience of the virtual FLS service. N/A, not available/no response



for DXA scanning to complete the diagnostic work up, more regular follow-up, and thanks for provision of written educational information (Appendix Table 2). One respondent highlighted a preference to use mobile phone communication rather than the home telephone.

Discussion

The COVID-19 pandemic is unprecedented in the modern era and has impacted all aspects of life including the delivery of acute and unscheduled care and elective outpatient clinics. In many areas in the UK and internationally, DXA services were down-turned during the earlier phases of the pandemic. This resulted in cessation of FLS clinics in some areas and the need to consider alternative methods of service delivery [4–6]. Other factors including travel restriction and self-isolation impacted patient access.

At an early stage, we recognised the need to consider new models of service delivery within the osteoporosis service [7]. We utilised pre-existing systems to support virtual telephone clinics for assessment of medication concordance and already had an agreed system in place for outpatient clinic bookings and administrative support [1]. In early April 2020, we rolled out virtual FLS clinics for those presenting to fracture services using established processes in line with best practice [1]. This was an important clinical priority recognising that the risk of re-fracture is highest in the months following initial fracture, and any delay in intervention may adversely impact outcomes. Our goal was to ensure that patients presenting with fragility fracture were offered an early opportunity for fracture risk assessment and to provide health promotion advice and intervention with fracture prevention treatments according to NOGG

guidance and in line with best practice recommendations [2, 7, 8]. We relied upon clinical risk assessment using established fracture risk prediction tools with FRAX to support clinical decision-making [2, 6]. Using these model virtual telephone clinics could therefore support early clinical intervention, primarily with treatment using oral bisphosphonates.

While there is some evidence that telemedicine supports patient management in fracture prevention services, there are gaps in knowledge around acceptability to service users [3]. Our patient survey data suggests that the virtual model with fracture risk assessment is acceptable, at least during the COVID lock down situation. We observed that virtual clinics are effective in delivery of fracture risk assessment and clinical management with positive patient experience as evidenced by results from our anonymised patient experience questionnaire. Most of these were new patients to the FLS service, although 15% had previously attended the service following an earlier fracture. A majority of respondents rated the quality of the clinical engagement highly and would recommend the service to others.

Advantages of virtual clinics in the telehealth environment included reduced footfall within imaging departments, ease of access for patients who may be self-isolating, or in vulnerable categories, and to improve early patient access during a period with high imminent fracture risk. In the early phase of the pandemic, we were limited to telephone-based virtual clinics, which were used in a pragmatic way and are accessible to the wider population that we serve, who are primarily older. Using this approach, we were able to rapidly respond to the clinical situation, as there was no requirement for staff training. More recently, our healthcare Trust has invested in secure videoconferencing and booking systems to support video consultations, which is a potential area for future research.

There are some limitations with virtual telephone FLS assessment. Firstly, telephone consultations are not ideally suited to assess clinical factors including height, weight, and falls risk remotely, with a reliance primarily on the clinical history. Secondly, it is unclear whether video, rather than telephone consultations, offers any advantage to clinicians or service users in this respect of assessment or management of fracture risk. Thirdly, a significant proportion of the FLS case load still requires DXA follow-up to complete the clinical assessment including those with hearing loss or cognitive impairment who might be unable to safely participate in a telephone consultation. Finally, a telephone consultation may miss visual clues including kyphosis, endocrine stigmata, or other clinical characteristics. Nevertheless, virtual clinics mitigated delays in fracture prevention interventions during this period. This was particularly important in our region as there had been a period of industrial action just prior to the COVID pandemic, which had impacted timely access to FLS, in the preceding months. A small number of patients declined active treatment,

preferring to wait for the outcome of DXA scanning. A partly unanticipated outcome of this initiative has been a backlog of DXA scans pending as services resumed. This is compounded by reduced service capacity, due to requirements around infection control and cleaning between scans with an approximate reduction in scanning capacity by around 50%. Face-to-face clinics require standardisation of outpatient protocols including use of PPE, ventilation, hand disinfection, and minimising footfall and are paramount [9].

In conclusion, virtual FLS clinics offer utility for fracture risk assessment and intervention in a secondary fracture prevention clinic. Results from our patient survey indicate that the clinical encounter was positive and informative. Going forward this service development provides a useful framework to inform decision-making around future service planning to optimise access to fracture prevention strategies [8]. A hybrid model that includes face-to-face appointments and virtual clinics is planned. Case triage with risk stratification will be used to target those at highest risk of fracture.

Appendix 1

Table 2 Service improvement suggestions from patient survey: free-text responses

Service improvement suggestions—free text responses

After COVID-19, I would appreciate a DXA Scan appointment, to ensure that I *definitely* am required to be on the medication I am taking for strengthening bones

Cannot think of anything. From start to finish, the care was first class

Could be more personal

Follow-up on patients to reinforce the importance of taking medication to strengthen bones

Request for an education campaign that advises women that a very real danger of the menopause is that it can cause osteoporosis

Importance of treating people as equal and not depending on age. Over the age of 60 is not old, and most people are still working and are active

Keep going as you are. I am 80 years old, and the health service at all points has been excellent. I have had a heart problem from the age of 28 years old, and I have no complaints

Request for more regular contact

My contact with the fracture liaison service was good but was unsatisfactory in that I did not receive a bone density scan (a DXA Scan), and the suggested treatment was by virtual assessment

All good

Complete satisfaction with telephone consultation

Great phone review. So useful to have a fact sheet on dietary information received by post

It was first class

No changes at all. Could not have been more helpful. I spoke to such a nice person

Service is excellent

The whole department does a good job

Received an excellent service. A credit to the health service

Service is excellent

I have absolutely nothing to complain about—it was excellent

Ensure to use the right phone number (mobile number rather than house phone number)

Availability of data and material Not applicable.

Code availability Not applicable.

Declarations

Ethics approval This service improvement project/audit did not require ethical approval.

Consent to participate Not applicable.

Consent for publication Not applicable.

Conflicts of interest None.

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