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Trauma assessment clinic: Virtually a safe and smarter way of managing trauma care in Ireland

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ABSTRACT

Introduction: The Trauma Assessment Clinic [TAC], also referred to as Virtual Fracture Clinic, offers a novel care pathway for patients and is being increasingly utilised across the Irish and UK health care systems. The provision of safe, patient centred, efficient and cost-effective treatment via a multidisciplinary team [MDT] approach is the primary focus of TAC. The Trauma and Orthopaedic unit at Tullamore Hospital was the first centre to introduce a TAC in Ireland and this overview outlines the experiences of this pilot.
Methods and Patients: Patients arriving to the Emergency Department with injuries that were TAC appropriate were treated as per a recognised protocol. They were given information regarding their injury and a removable splint or cast and told to expect a follow up phone call from the orthopaedic team. Within 24 h the patient's clinical notes and x-rays were assessed by the TAC MDT and patients were called immediately to be advised as to their planned treatment.
Results: To date the TAC pilot in Tullamore Hospital has reviewed 2704 patients. 35% of patients were discharged at the TAC review stage, 27% were referred to an appropriate clinic (e.g. Shoulder injuries referred to an upper limb specialist) or a general trauma follow-up clinic, and 38% were referred onto physiotherapy services local and community based for follow-up. A survey of patients reviewed in the TAC revealed that 97% of respondents agreed or strongly agreed that they were satisfied with their recovery. The cost of each TAC consultation was €28 versus €129 for a traditional fracture clinic appointment.
Conclusion: Our experience of the TAC is that it provides a very safe, patient focused and cost-effective means of delivering trauma care. It provides a more streamlined and improved patient journey in select patients with certain fracture patterns, allowing for patient empowerment without compromising clinical care and marries current available technology with up to date best clinical practice.

Introduction

Three quarters of all limb fractures in the UK are included in the conservative, non-operative management of trauma in the outpatient setting and 50% of patient presentations to emergency departments are musculoskeletal in nature [1,2]. This in turn leads to a large volume of referrals to the traditional "face to face" fracture clinic which results in a significant drain on hospital resources [3]. Some units have developed certain triage systems, which range from nurse led clinics to "rapid-review" consultant led processes, in order to deal with this cohort [2,4]. This has evolved overtime and in 2011 the Virtual Fracture Clinic (VFC) pathway was pioneered at Glasgow Royal Infirmary. In this model patients who present to the Emergency Department (ED) with simple, stable fracture patterns who do not require urgent admission are discharged directly from the ED or referred to the VFC. At a regular, orthopaedic consultant-led, multidisciplinary team (MDT) meeting the patient's clinical notes and radiographs are reviewed and the subsequent treatment plan is discussed with the patient via a phone call immediately afterwards. These patients are either discharged directly or followed up in a nurse-led or sub-specialty clinic [1,5].

The concept of virtual clinics has been adopted by several medical specialities and has been shown to be safe, cost effective and efficient in delivering an improved patient journey associated with high levels of patient satisfaction [6–12]. There is an increasing body of evidence to support the promotion of patient "self-care", early mobilisation and reduced follow-up for certain fracture types (See Table 1) [13–21]. Maintenance of patient safety,

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Table 1
TAC appropriate fractures.

Fracture types appropriate for TAC (VFC) review
Simple Fifth Metacarpal Fracture
Simple Fifth Metatarsal Fracture
Simple Clavicle Fracture
Simple Radial Head Fracture
Torus Fracture
Mallet Finger Injury (no boney involvement)

good functional outcomes and high satisfaction levels have also been revealed with some patients preferring the optional or no follow-up route [13,15–18,20–30]. More recently, studies from centres with established VFC's, reveal a safe and robust patient pathway with good functional outcomes and patient satisfaction [3,31–36]. Fracture clinic redesign and reorganisation of services is also cost effective with some studies showing a direct saving, through a reduction in staff utilisation resources, of nearly 40% versus the traditional "face to face" clinics [36–39]. Whilst the indirect costs are more difficult to ascertain, some studies have quoted a societal cost of nearly €80 per consultation due to productivity loss and half a school day lost in the context of paediatric fracture clinic follow-up [1,40,41].

In our institution a similar pathway referred to as the Trauma Assessment Clinic or TAC was introduced in 2016 and was the first of its kind in the Irish Public Health System. This overview outlines the workings and experiences of this pilot.

Methods and patients

Patients arriving to the Emergency Department at Tullamore Hospital, with injuries that were TAC appropriate as seen in Table 1 were treated as per a recognised protocol which was agreed between the ED and Trauma and Orthopaedic departments. Patients were given information regarding their injury and a removable splint or cast and told to expect a follow up phone call from the orthopaedic team. Within 24 h the patient's clinical notes and x-rays were assessed by the TAC MDT which is led by an orthopaedic consultant and includes a specialist nurse and an extended scope physiotherapist (ESP). Patients were called immediately after the TAC to be advised as to their planned treatment. At this point, depending on the clinical scenario, patients were either discharged directly from the TAC with appropriate advice and phone helpline number or else followed up in a physiotherapist-led clinic, sub-speciality clinic, general trauma clinic or an ED review clinic. If there were any concerns or uncertainty patients were informed to ring the dedicated helpline or were called back to a traditional "face to face" clinic for review (Fig. 1).

Results

To date the TAC pilot in Tullamore Hospital has reviewed 2704 patients over a 19 month period. In the first 9 months of the pilot the TAC MDT consisted of a consultant and specialist nurse. During

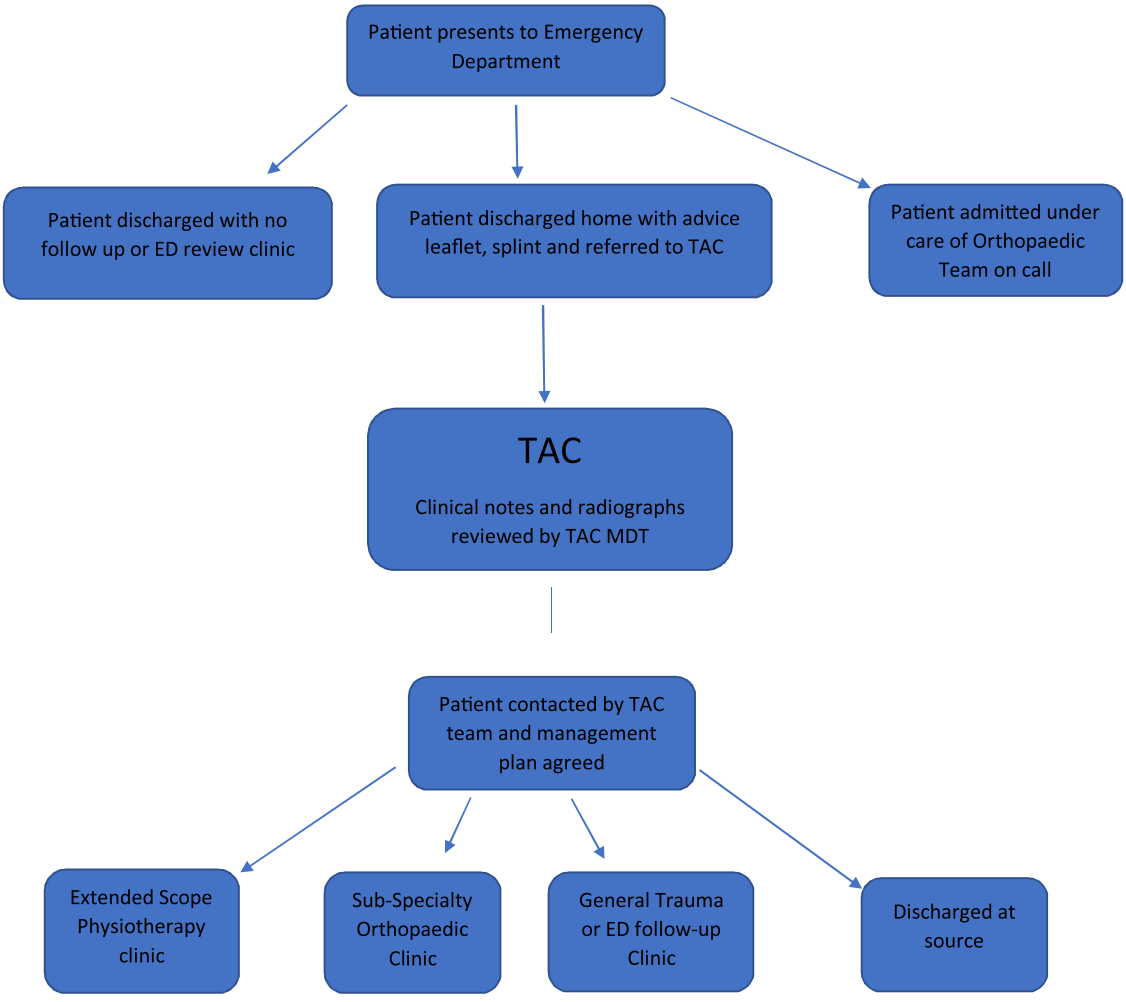

Fig. 1. Trauma Pathway at Tullamore Hospital.

this period a total of 1322 patients were referred to the TAC and 414 (31%) were discharged directly. The remaining 10 month period of the pilot saw the introduction of an extended scope physiotherapist to the TAC MDT. In this period a total of 1382 patients were referred to the TAC of which 487 (35.2%) were discharged directly, 518 (37.5%) were discharged to an extended scope physiotherapy clinic and the remainder 377 (27.3%) referred to a sub-specialty, ED review or general trauma clinic (see Fig. 2). During this period there were 1832 newly referred trauma patients reviewed in the traditional "face to face" fracture clinic. In the same 10 month period in 2014–2015, prior to the introduction of the TAC, there were 2676 patients reviewed in the traditional "face to face" fracture clinic revealing a reduction of almost a third in the number of referrals.

A follow up telephone survey of a sample cohort of patients discharged directly from the TAC was carried out in December 2017. All respondents either agreed or strongly agreed that the information they received over the phone from the TAC was adequate. All patients except for one either agreed or strongly agreed that they were satisfied with their recovery (see Fig. 3). The one patient who was dissatisfied had persistent symptoms and was offered an elective sub speciality outpatient appointment. Only two patients re-presented after TAC discharge: one patient to their GP for analgesia and one patient to another institution for a change of cast as it was not fitting comfortably. All patients except two felt that it was clear that the TAC service could be accessed directly at any time if they had any difficulties (see Fig. 4).

At our institution a cost analysis and cost comparison was carried out between the TAC and the traditional "face to face" fracture clinic [42]. The cost of a traditional clinic per patient is €129 versus the cost of the TAC which is €28 showing a cost saving of €101 (see Table 2).

The input of hours per clinic for the extended scope physiotherapist and nurse specialist are 7 at a cost of €207 each with consultant and administrative staff input hours 1 and 5 respectively at a cost of €73 each (see Table 3).

The total number of patients reviewed in the TAC is 2704 which via a Traditional Fracture clinic route would cost €348,816 versus the TAC cost of €75,715 revealing a cost saving of €273,104 (see Table 4).

Discussion

The introduction of the TAC at our institution is both safe and cost effective. Of the patients surveyed 97% either agreed or strongly agreed that they had a satisfactory recovery and each TAC consultation saves approximately €100 versus the traditional "face to face" fracture clinic. Over the period from which it was commenced 2704 patients were referred to the TAC revealing a cost saving of over quarter of a million euro. In terms of patient pathway since the addition of the ESP to the TAC MDT over a third

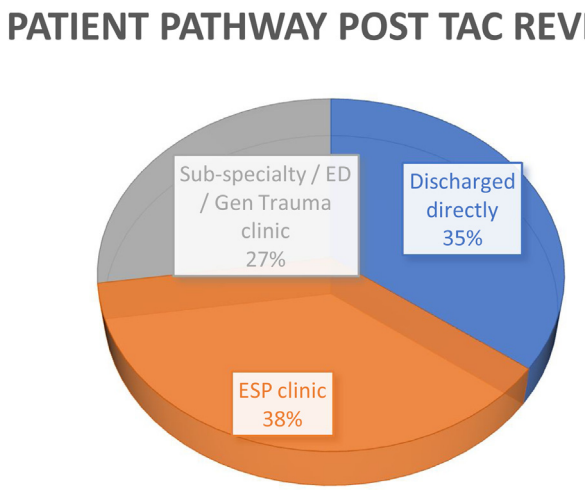

Fig. 2. TAC.

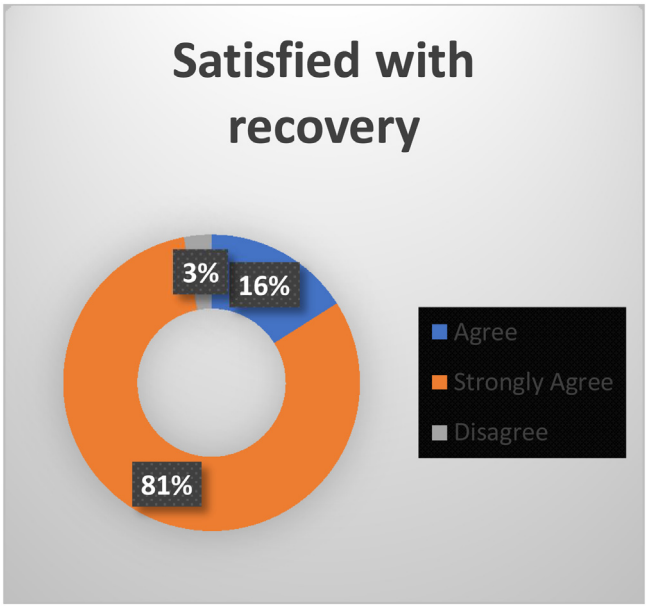

Fig. 3. Patient Satisfaction.

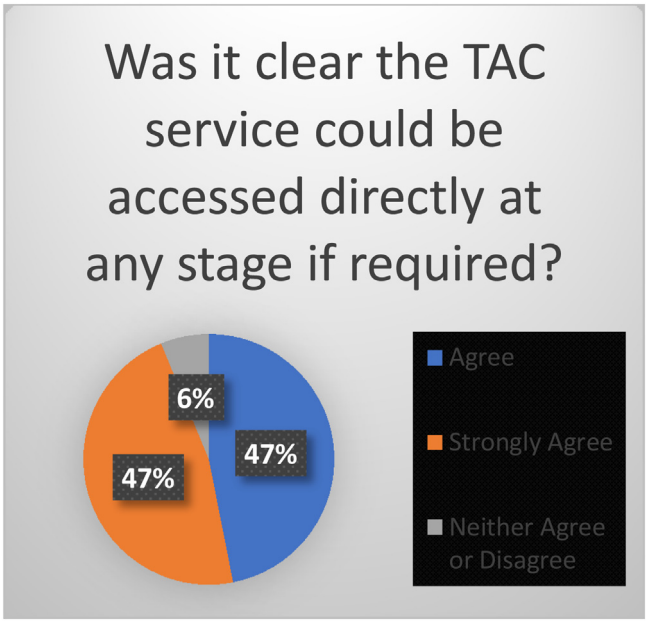

Fig. 4. Patient Access.

Table 2
Cost comparison.

Clinic Type	Cost per patient
Traditional Fracture Clinic	€129
TAC	€28
Cost Saving	€101

Table 3
Cost breakdown.

Staff Grade	Hours Input per clinic	Cost
Extended Scope Physiotherapist	7	€207
Nurse Specialist	7	€207
Orthopaedic Consultant	1	€73
Administration	5	€73
Total		**€560**

Table 4
Cost saving.

Patients reviewed in TAC to Date	2704
Traditional Fracture Clinic	€ 348,816
TAC	€ 75,715
Cost Saving	**€ 273,104**

of patients are being followed-up in an ESP led clinic, another third discharged directly and the remainder being followed-up in other review clinics.

A clinical pathway is a way of managing the care of a specific group of patients at a specified point in time which is formulated by evidence-based medicine and best practice [43]. All stakeholders within a healthcare system should strive for the same common endpoint through shared "interests and activities" thereby allowing for improved "patient value" [44,45]. Standardisation of healthcare delivery, based on evidence-based guidelines, is believed by some healthcare providers to be the "most predictable path to enhancing value in healthcare" and is believed it could lead to better quality, better volume output, less complications and less costs but unwanted practice variation is detrimental to this ethos [45,46]. This is of particular concern within trauma and orthopaedic care as considerable practice variation still exists in the management of common fractures [47,48]. The TAC provides a novel pathway for the trauma patient and is based on up to-date, best practice and standardised protocols. The British Orthopaedic Association Standards for Trauma, or BOAST 7 was released in 2013 to provide guidelines for fracture clinic services and the TAC/VFC model is compliant with these standards [49,50]. A possible concern regarding the TAC/VFC pathway is it's potential "front-loading" effect on the ED but in fact one particular study showed no adverse outcome on performance and even found that certain injury patterns were treated in a faster time frame due to the advent of standardised protocols and a shift towards removable splints versus the time consuming application of unnecessary casts [51].

Out-patient clinic based teaching is a very important part of specialist trainee and medical student training and the introduction of the European Working Time Directive (EWTD) has decreased the exposure of trainees to clinical practice [52,53]. There is also evidence from the US that trainees don't feel they have adequate time to ask relevant patient management questions [52]. The TAC/VFC model provides a useful teaching platform which is focused, covers a broad range of topics and allows a comfortable, unintimidating setting for discussion amongst trainer, specialist trainees and medical students [1,52–54].

Some reports have stated that over two thirds of diagnostic errors in ED's are due to the mis-reading of x-rays and nearly half of all claims against ED services are because of incorrect diagnoses of fractures and dislocations [55,56]. More over it has been reported that nearly a fifth of patients attending a traditional fracture clinic had been given an incorrect diagnosis at the time of their referral [55]. The TAC/VFC model provides a safety net in these situations to both patient and staff [37]. The avoidance of professional negligence claims can be achieved via "robust, up-to-date protocols that are based on national standards" [57]. In the pioneering centre for this virtual model there is no pending medicolegal cases following the management of over 30,000 patients via this pathway [37]. We are also glad to report that there are no medicolegal actions pending at our centre since the introduction of the TAC. Clinical governance is key to this and is the responsibility of both the clinician, to insure maintenance of high standards, and the manager, in the provision of sufficient collaterals [58].

The authors do wish to emphasise that only certain fracture patterns, as described in Table 1, are amenable to appropriate management via this pathway and therefore guideline-based selection and referral of patients is essential. It is still in its infancy but overall the introduction of the TAC at our unit has been a success and there remains scope for several improvements. One potential amendment to the TAC would be the use of a completely paperless referral system and a recent pilot study at our centre showed positive results in this regard [59]. The addition of a fracture liaison nurse would be a welcome addition to the TAC MDT to deal with the cohort of osteoporosis/ fragility related fractures and the provision of more web based adjuncts to rehab physiotherapy would be an additional help to patients. Also electronic recording of the patient phone call following the TAC MDT would add further weight to the already robust consent process. The auditing of patient satisfaction and experiences of the TAC is also something which the unit intends to expand on.

Conclusion

Our experience of the TAC is that it provides a very safe, patient focused and cost-effective means of delivering trauma care in Ireland. It provides a more streamlined and improved patient journey in select patients with certain fracture patterns, allowing for patient empowerment without compromising clinical care and combines current available technology with up-to-date best clinical practice.

Conflicts of interest

Nil to report.

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