The Safety & Efficacy of a Virtual Fracture Clinic in a major Australian tertiary trauma hospital

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Pilot: Collaboration with Western Health North Western Melbourne Primary Health Network
Research team

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Ms Emily Cross      Virtual Fracture Clinic Co-Ordinator (Advanced Practice
                      Physiotherapist)
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Mr Andrew Oppy      Orthopaedic Trauma Consultant
A/Prof Andrew Bucknill  Head of Unit, Department of orthopaedic Surgery /
                        Orthopaedic trauma consultant
Ms Olga Montvida    Statistician
Mr Tom Treseder     Orthopaedic Trauma Consultant
The Royal Melbourne Hospital

- Major trauma public hospital
- 465 beds
- Department of Orthopaedic Surgery
  - 16 consultants, 8 registrars
- 2,212 trauma patients treated in 2017/18
- >10,000 orthopaedic clinic appointments pa
Challenges

- Growth in ED presentations
  - 5.9% increase 2015/16
- Demand for outpatient specialist services exceeds capacity
  - 20.6% increase in hospital outpatient activity over the past 2 years
- Long wait times for outpatient appointments
- Long wait time to be seen in clinic

(Australian Hospital Statistics, 2017)
• Glasgow Royal Infirmary

• 32 NHS trusts UK

• Premise: many ambulatory MSK injuries have excellent prognosis without specialist orthopaedic intervention

• Telephone consultation provided in place of clinic attendance

• Clinically effective & cost effective model

  (Vardy et al 2014, McKirday & Imbuldeniya 2017)
Project aims

1. Implement a surgeon led VFC in an Australian level 1 trauma hospital

2. Investigate resource efficacy and safety of new model of care
Study design – prospective study (15 months) with retrospective control (15 months)

- November 2015 – February 2017

Assessing the effect of VFC management of Emergency Department (ED) referrals on outpatient clinic utilisation

Ethics approval – Ethics approval was obtained from the Melbourne Health Human Research Ethics Committee (2019.049, QA2018082)

Participants – ED-generated orthopaedic referrals for non-admitted patients with a single musculoskeletal injury
Developing our VFC

• Meeting with key stakeholders
  • Referral pathways from ED
  • Referral pathways to radiology (Booking Xrays, CT, MRI, US)
  • Setting appointment schedules with plaster technician and physiotherapy
  • Admin support / finance / funding
• Development of patient handouts and brochures
• Development of Orthopaedic management protocols for common conditions
• Setting guidelines for inclusion / exclusion
• Set up email address and telephone hotline
Efficacy

Primary outcome:
• clinic resource utilisation per referral

Secondary outcomes:
• Referrals lost to follow up
• proportion of patients directly discharged by the VFC
• wait time from ED discharge to first orthopaedic contact

Safety

Primary outcome:
• unplanned hospital re-attendances: ED, outpatient clinic or surgery

Secondary outcome:
• Adverse outcomes/events
Model of care – pre VFC

ED referral

Outpatient clinic
Model of care – post VFC

Referrals screened

ED referral

Virtual Fracture Clinic
Consultant review
Patient telephone call

Outpatient clinic
Other service / specialty
Surgery
Discharge +/- GP follow up
# Patient characteristics

<table>
<thead>
<tr>
<th></th>
<th>Pre VFC</th>
<th>Post VFC</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of referrals</td>
<td>1,899</td>
<td>2,023</td>
<td></td>
</tr>
<tr>
<td>Male, n (%)</td>
<td>1,086 (57.2)</td>
<td>1,127 (55.7)</td>
<td>0.35</td>
</tr>
<tr>
<td>Age, median (IQR)</td>
<td>36 (26,55)</td>
<td>37 (26,56)</td>
<td>0.69</td>
</tr>
<tr>
<td>- Age Females, median (IQR)</td>
<td>48 (30,66)</td>
<td>46 (29,64)</td>
<td>0.27</td>
</tr>
<tr>
<td>- Age Males, median (IQR)</td>
<td>32 (25,45)</td>
<td>32 (24,46)</td>
<td>0.96</td>
</tr>
<tr>
<td>Injury classification, n (%)</td>
<td></td>
<td></td>
<td>0.56</td>
</tr>
<tr>
<td>Upper Limb</td>
<td>1,107 (58)</td>
<td>1,166 (58)</td>
<td></td>
</tr>
<tr>
<td>Lower limb</td>
<td>740 (39)</td>
<td>797 (39)</td>
<td></td>
</tr>
<tr>
<td>Spine</td>
<td>39 (2)</td>
<td>38 (2)</td>
<td></td>
</tr>
<tr>
<td>Axial</td>
<td>5 (0)</td>
<td>5 (0)</td>
<td></td>
</tr>
<tr>
<td>Multiple areas</td>
<td>8 (0)</td>
<td>17 (1)</td>
<td></td>
</tr>
</tbody>
</table>

Chi squared test or Fisher’s exact test were used to compare categorical data between pre and post-VFC groups.

Wilcoxon Mann-Whitney test was applied for numerical comparisons.
ED referrals screened
N=2,023

Outpatient clinic (n=282 + 1140)
Virtual discharge (n=849)
Other specialty/hospital (n=33)
Surgery (n=1)

Ineligible for virtual management (n=282)
(default to clinic)
No imaging (78)
Existing clinic appointment (38)
Spine (38)
Non English speaking (36)
High velocity trauma (32)
Existing surgeon plan (27)
Neurovascular concern (10)
Patient no phone access (9)
Complex injuries (10)
Pregnancy (4)

Patients reviewed by VFC consultant
N =1,741

Results - patient flow pre vs. post VFC

Outpatient clinic (n=1895)
## Results – cause for failure of virtual management (n=167)

<table>
<thead>
<tr>
<th>Cause</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in condition requiring in person review</td>
<td>84</td>
</tr>
<tr>
<td>Patient didn't answer phone / unable to contact</td>
<td>50</td>
</tr>
<tr>
<td>Patient 'opt out' of virtual management</td>
<td>18</td>
</tr>
<tr>
<td>GP requesting review</td>
<td>5</td>
</tr>
<tr>
<td>ED re-attendance</td>
<td>4</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
</tr>
<tr>
<td>Unplanned surgery</td>
<td>2</td>
</tr>
</tbody>
</table>
ED referrals screened
N=2,023

Outpatient clinic (n=1286)
Virtual discharge (n=677)
Other specialty/hospital (n=57)
Surgery (n=3)

Ineligible for virtual management (n=282)
(default to clinic)
No imaging (78)
Existing clinic appointment (38)
Spine (38)
Non English speaking (36)
High velocity trauma (32)
Existing surgeon plan (27)
Neurovascular concern (10)
Patient no phone access (9)
Complex injuries (10)
Pregnancy (4)

Patients reviewed by VFC consultant
N=1,741

Results - patient flow pre vs. post VFC
Results - efficacy

Clinic resource utilisation
Number of patients NOT requiring in-person appointment

677 (33.5%) discharged ‘virtually’

Clinic resource utilisation
Average appointments per referral (within 90 days of screening)

Pre: 1.67
Post: 1.06
p<0.01
**Results - efficacy**

Wait time to orthopaedic contact

*mean (IQR)*

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<thead>
<tr>
<th>Pre</th>
<th>Post</th>
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<tbody>
<tr>
<td>7 (5-9) days</td>
<td>2 (1-3) days</td>
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Referrals lost to follow up / Failed to attend clinic appointment

<table>
<thead>
<tr>
<th>Pre</th>
<th>Post</th>
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<tbody>
<tr>
<td>280 (14.7%)</td>
<td>144 (7.2%)</td>
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p<0.01
Unplanned ED re-attendance (within 30 days) for same complaint

Pre: 123 (6.4 %)  Post: 105 (5.2%)  P=0.49

Adverse events (90 days post VFC period screening)

Nil reported
Sustainability and future direction

• Business case accepted for permanent new funding at Royal Melbourne Hospital

• Potential to grow
  o manage referrals direct from GP (save ED presentations)
  o expand range of conditions managed (? Spine)
Results – summary

- Fewer outpatient appointments needed -> VFC direct discharge rate 33.5%
- Reduced outpatient clinic FTA rate by 7.5%
- Reduction in unplanned ED re-attendance (6.4% down to 5.2%)
- Fewer appointments needed (average) per referral -> by 38.5%
- Shorter wait for first orthopaedic contact by 5 days (average)
- No reported adverse events
Fewer outpatient appointments needed → VFC direct discharge rate 33.5%

Fewer appointments needed (average) per referral by 38.5%

Reduced outpatient clinic FTA rate by 7.5%

Shorter wait for first orthopaedic contact by 5 days (average)

Reduction in unplanned ED attendance (6.4% down to 5.2%)

Virtual Fracture Clinic Model is applicable to Australian Healthcare system and led to more efficient use of orthopaedic outpatient clinic services

The improvement in resource utilisation did not come at the cost of safety
Thank you
References