Parent reliability detecting neurovascular complications in children with plasters

Di Crellin [1-3], Akshay Bapat [2], Franz Babl [1-3]

Royal Children's Hospital

The University of Melbourne

Murdoch Children's Research Institute

Research background

- Limb fractures common in the emergency department (ED) (Hart 2006)
- Immobilisation often with encircling plaster (Hutson 2004)
- Complications can occur secondary to plaster (Turner 2010)
- Plaster checks widely recommended (RCH Factsheet 2010, Kelly 1996)

Research background

- 2009 RCH audit of families of children plastered in ED showed
  - Patients often not referred for a plaster check
  - Families don't always remember the details of plaster instructions (Crellin et al, 2009)
- No studies examining parents' ability to detect abnormal neurovascular findings or complications

Aims of the study

Primary objective:

- To determine the reliability of parents in detecting abnormal neurovascular findings following application of an encircling plaster for “complex” limb fractures

Study design

- Prospective inter-rater reliability study
- Eligible patients recruited for plaster check approx 24h following plaster application
  - Inpatients seen on the ward
  - Outpatients asked to return to ED
- Parent and treating clinician assessed neurovascular parameters
- Older patients (>12 years) also completed the assessment

Data collection

- Demographic data
- Assessment data - ‘plaster check’
  - Swelling
  - Colour change
  - Temperature change
  - Movement
  - Findings of concern

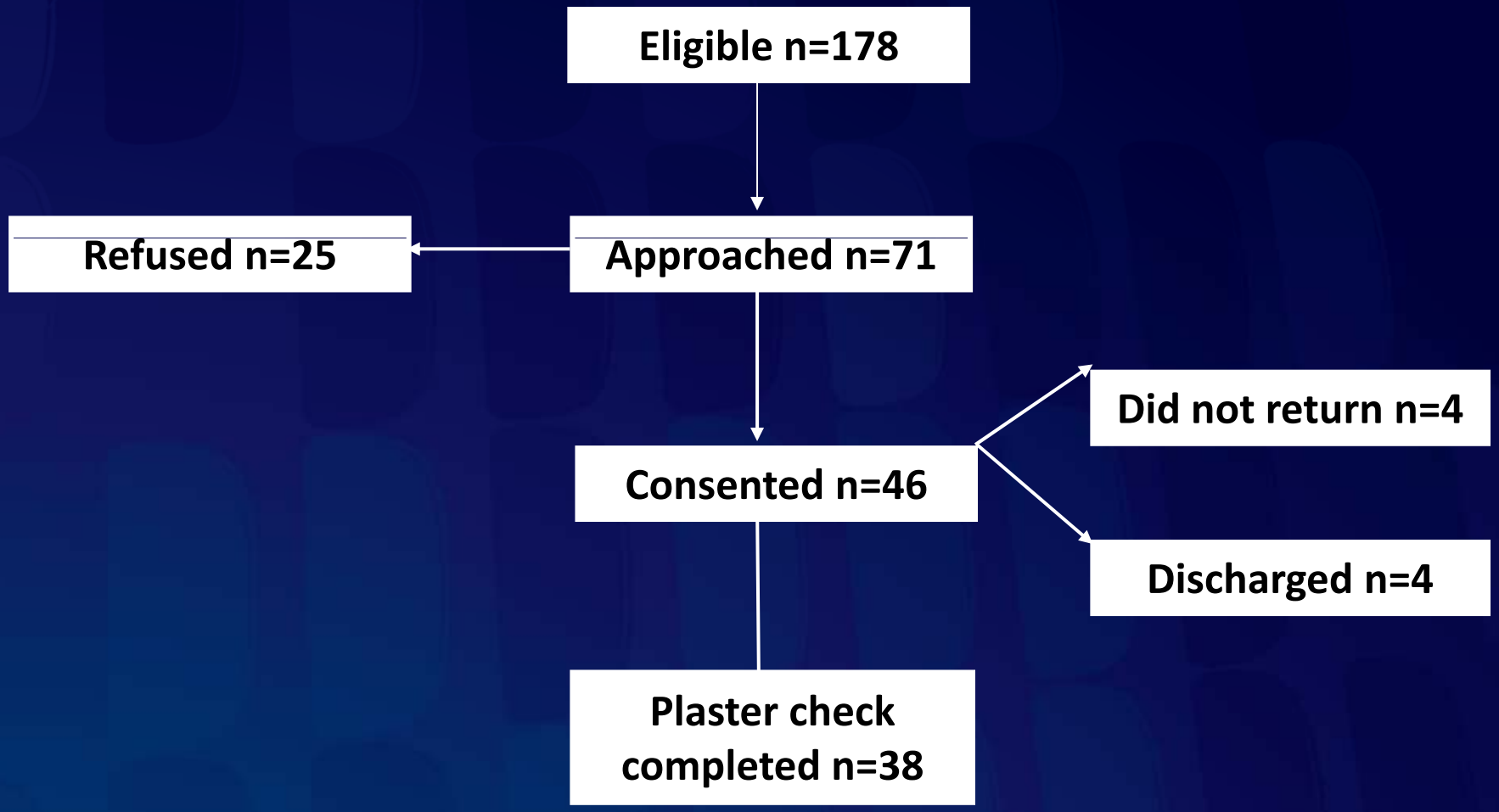
Participant selection

- Inclusion criteria:
  - 0-18 years old
  - “Complex” limb fractures
  - Encircling plaster applied
- Exclusion criteria:
  - Parents requiring an interpreter

“Complex” fractures

- A fracture where there is an increased risk of swelling and therefore complications such as compartment syndrome
- Therefore defined as a:
  - Fracture requiring manipulation
  - Fracture to the lower limb
  - Fracture resulting from a crush injury

Results - Recruitment



Results - Demographics

- Age
  - Mean age 8.9 years
  - Median 9.7 years
  - Range 1.9 to 15.1 years
- Gender
  - 29 males (76%)

Results - Fracture details

Bones fractured

	N (n= 38)	%
Radius only	9	23.7
Ulna only	1	2.6
Radius & ulna	23	60.5
Tibia only	2	5.3
Fibula only	1	2.6
Tibia and fibula	2	5.3

Sedation during manipulation

	n (n= 35)	%
Biers block	18	51.4
N2O	10	28.5
GAMP	4	11.4
IV ketamine	2	5.7
Fentanyl	1	2.9

Note: manipulation not required in 3 cases - All in lower limb

Results - outcome

Outcome of plaster check:

	N (n = 38)	Freq (%)
Discharged with no intervention	29	76.3
Plaster trimmed	3	7.9
Plaster removed	2	5.3
Additional surgery	1	2.6
Admitted for elevation	3	7.9

Results – parent assessment

Inter-rater reliability – parents v's treating clinician

	% agreement	Kappa value
Swelling	75.4	0.011
Colour change	86.8	0.347
Temp change	84.2	0.182
Change in sensation	73.7	0.030
Loss of movement	81.6	0.059
Findings of concern	73.7	0.030

Kappa .< 0.4 = poor 0.4 – 0.75 = fair to good >0.75 = excellent

Findings of concern

Doctor \ Parent	Yes	No	Total
Yes	1 (3%)	8 (21%)	9 (24%)
No	3 (8%)	27 (68%)	30 (76%)
Total	4 (11%)	34 (89%)	38 (100%)

Limitations

- Single centre study
- Convenience sample
- Small sample size (n=38)
  - Small numbers of abnormal findings

Discussion - Parent reliability

- Poor agreement between parents and clinicians
  - Kappa values range from 0.01 to 0.35
- Parents
  - more likely to report positive findings
  - less likely to report that findings were concerning
- Audit data
  - poor recall of signs and symptoms
  - very confident (96%) in deciding if medical help is needed

Discussion - Parent reliability

- Implications
  - Parents may not understand the importance of findings
  - May not seek help as confident with their decision
  - Discharge education may not be adequately preparing parents

Further work/questions

- Larger scale study
  - Multicentre
  - Larger number of positives
- Review discharge education
  - Highlight the importance of findings

Conclusion

- Plaster checks performed by a clinician still an important part of fracture management

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