

# Spina Bifida Spinal Surgery Clinical Outcomes Review 2023

Signed off by CHI at Crumlin Clinical  
Directorate – 18/09/23

Sláinte Leanaí Éireann



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CHI Corporate | Crumlin | Temple Street | Tallaght | Connolly



# Review parameters & purpose

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- ▶ The purpose of this review was
  - To collect data regarding potential complications post spinal surgery in spina bifida patients
  - Highlight any areas of concern & possible needs for improvement
- ▶ The review was to include all patients with spina bifida who underwent spinal surgery from 1<sup>st</sup> January 2020 to 31st December 2022
- ▶ The review was to follow the Temple Street template of data collection which contained 49 data points and is the model being used for an review in CHI at Temple Street also.

# Review process

## Identifying the patients who fit the agreed criteria

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- ▶ The spina bifida database was used to identify all the patients who attend CHI at Crumlin for Orthopaedic care
- ▶ This list was then cross checked against the orthopaedic surgical activity database to identify the patients who had undergone spinal surgery vs general orthopaedic surgery
- ▶ Patients who had surgery pre January 2020 were automatically discounted as they did not meet the review parameters
- ▶ Between 1<sup>st</sup> January 2020 & 31<sup>st</sup> December 2022
  - 96 orthopaedic surgeries were performed on patients with spina bifida
  - 17 of these were non spinal orthopaedic surgeries carried out on 7 patients
  - The remaining 79 surgeries were spinal surgeries performed on 13 patients.
  - Of the 13 patients, 11 met the surgical criteria for the review

# Review process

## Patient cohort details & collecting the data

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- ▶ 11 patients were identified as meeting the review criteria- these patients had a medical history of spina bifida and scoliosis and had spinal surgery between 1<sup>st</sup> January 2020 & 31<sup>st</sup> December 2022
- ▶ The age ranges of the patients that met the criteria were from 5 to 16 years
- ▶ There were 4 males & 7 females
- ▶ When the final 11 patients were identified, their medical records were reviewed over a 4 week period. This included:
  - Anaesthetic records, surgery notes, medication records, PICU records as well as medical & nursing notes
- ▶ The data was pulled and input into the Boston template
- ▶ The findings were collated and documented over the following slides

# Findings

## Breakdown of surgeries

- ▶ Of the 79 spinal surgeries, 66 surgeries were identified as spinal surgeries performed on 11 patients that met the review criteria\*
  - 42 surgeries were on an emergency list & 24 were on an elective list
    - 5 of the 11 patients had no emergency list returns to the operating theatre (OT)
    - 4 returned to OT between 1-9 times
    - 2 returned to OT between 10-20 times

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| No. of Patients | No. of OT returns |
|-----------------|-------------------|
| 5               | None              |
| 4               | <10               |
| 2               | <20               |

\* 13 surgeries performed on 2 other patients did not meet the surgical criteria for the review

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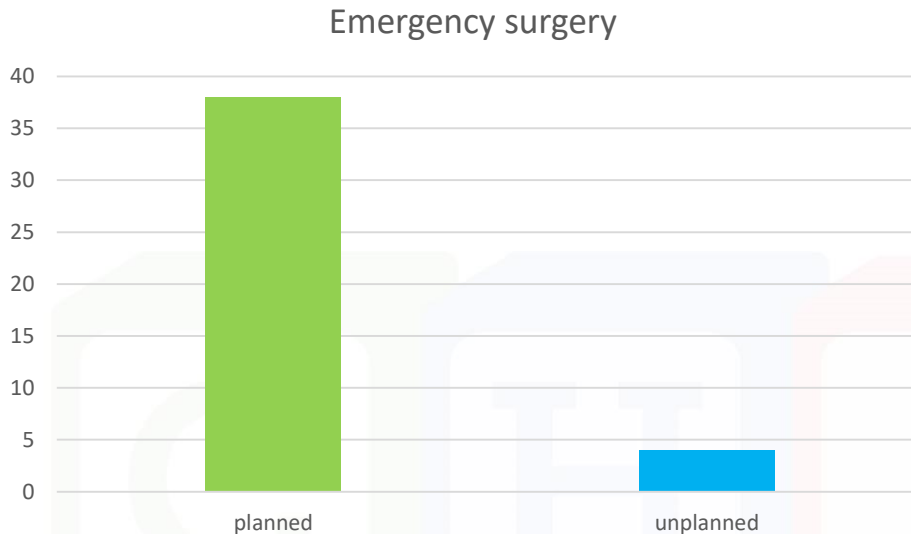


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# Findings

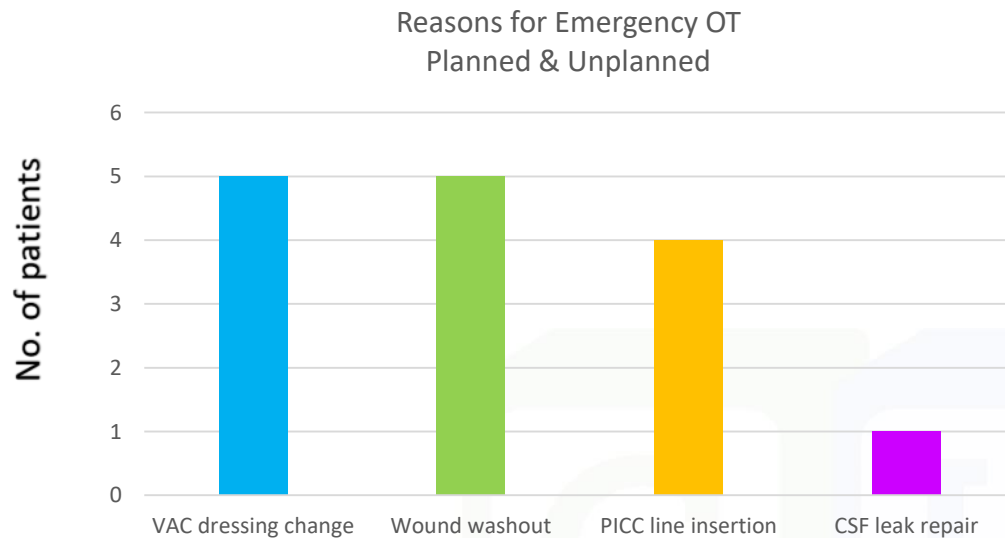
## Breakdown of surgeries (Cont'd)

- ▶ Emergency surgery: planned vs unplanned
- ▶ 42 surgeries performed on emergency list
  - 4 were unplanned surgeries
  - 38 were planned surgeries



# Findings

## Breakdown of surgeries (cont'd)



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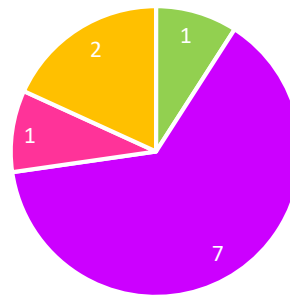
# Findings

## Breakdown of spinal surgeries

### ► Of the 11\* patients:

- 7 underwent posterior spinal fusion (PSF)
- 1 had PSF & Kyphectomy
- 1 had growth rods inserted
- 2 underwent growth rod lengthening

Surgery breakdown



- Posterior spinal fusion & Kyphectomy
- Posterior spinal fusion
- Growth rod insertion
- Growth rod lengthening

\*2 additional patients did not meet surgical criteria for the review but did have spinal procedures within the review time frame

These procedures were: Traction X-rays under GA and aspiration of skin & subcutaneous tissues

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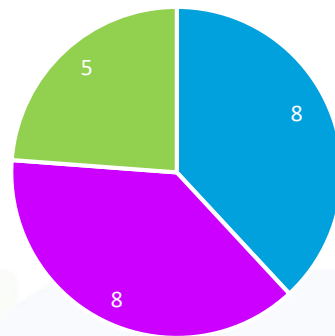
# Findings

## Pre assessment

### ► Of the 11 patients

- 8 patients had pre-assessment prior to surgery including ECG/ECHO, respiratory input, PFTs, physio review
- 3 did not have pre assessment.
- 8 had pre operative anaesthetic reviews either in person, via telephone or chart review.
- 5 were discussed at complex care/MDT pre operatively

Pre operative assessments



■ pre assessment ■ anaesthetic review ■ MDT/Complex care

# Findings

## Hospital stay

- ▶ Length of hospital stay: <24hours-151 days
- ▶ Length of hospital stay post op only:
  - Range <24hours-97 days
  - 6 patients' stay was <14 days
  - 2 patients' stay was >14 days & <25 days
  - 3 patients' stay was >25 days
  - Mean: 25 days
- ▶ Length of stay in PICU: <24hours-2 days
  - Number of patients requiring PICU post op: 5

### Summary of hospital stay

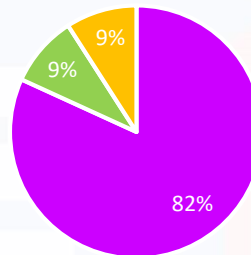
| LENGTH OF STAY        | RANGE IN DAYS |
|-----------------------|---------------|
| Total hospital stay   | 1-151         |
| Post op hospital stay | 1-97          |
| PICU stay             | <2            |

# Findings

## Intra-operative complications

- ▶ Out of the 11 patients, 9 had no identified intra-operative complications
- ▶ There was 1 instance of loss of motors
  - Motor response to one hand was lost on neurophysiological MEP (motor evoked potential) monitoring
  - Resolved after traction was removed
- ▶ There was 1 instance of residual metalwork fragments from a previous surgery
  - MAGEC rods had been removed due to migration into pelvis on a previous surgery.
  - Fragments were found during follow up surgery and subsequently removed.

Intra operative complications



■ none ■ loss of motors ■ residual metal work found post removal

# Findings

## Intra operative period

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- ▶ Hypothermia/time spent below 36 degrees Celsius was recorded for all 11 patients
  - Time spent between 35-35.9 degrees ranged from 1-3hours
  - The mean: 1.77hours
  - There was also 1 patient who spent 1 hour below 35 degrees (between 34 & 34.9 degrees)
- ▶ Estimated blood loss was recorded in 9 out of 11 patients
  - 8 PSF & 1 growth rod insertion
  - EBL ranged from 89.5ml-1474ml
  - The mean: 496.33ml

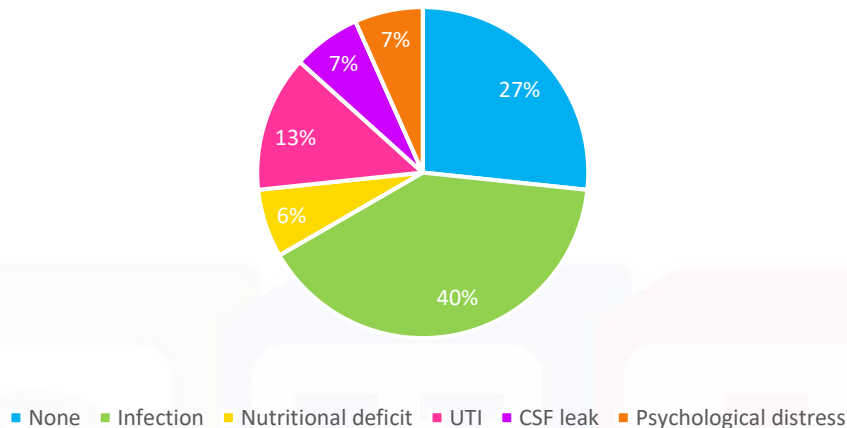


# Findings

## Post-operative complications

- ▶ 4 patients had no post operative complications
- ▶ 6 had post operative infections
- ▶ 1 had significant nutritional deficit requiring TPN over a long period
- ▶ 2 had post operative urinary tract infections
- ▶ 1 had a CSF leak
- ▶ 1 had significant psychological distress

Complication rates



# Findings

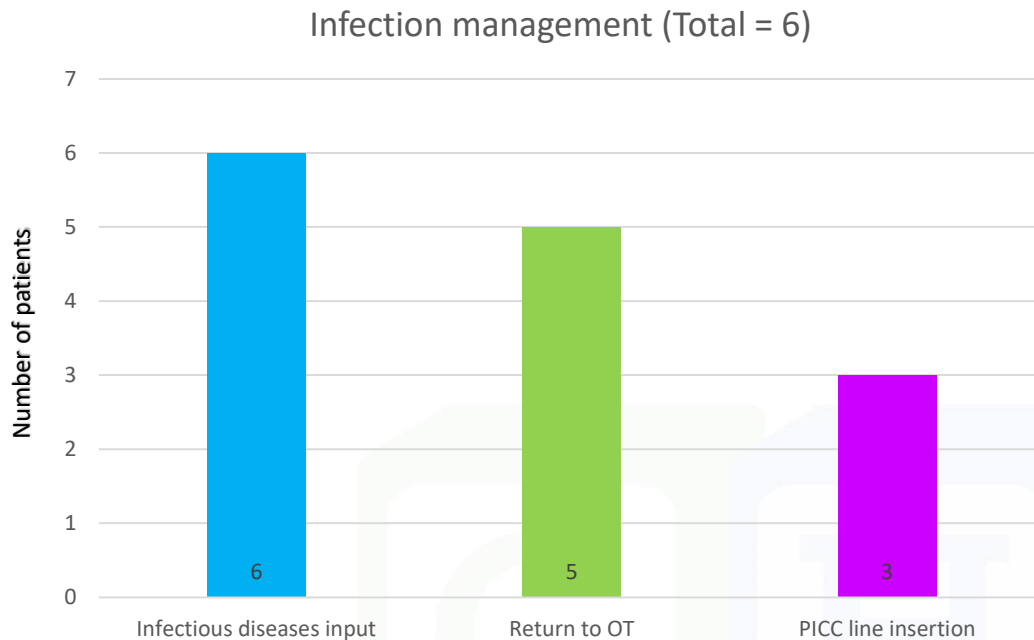
## Post-operative infections (Total= 6 patients)

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- ▶ Of the 6 identified post op infections:
  - 4 were post fusion, 1 was post fusion and kyphectomy & 1 was post rod insertion
  - Initial wound dressing from theatre:
    - PICO x3
    - VAC x2
    - Jubilee (Aquacel surgical) x1
  - 3 had Vancomycin directly to wound intra-operatively
  - 5 returned to theatre for multiple washouts and vac therapy applications
  - 1 returned to theatre for PICC line insertion
  - 1 had associated wound breakdown with plastics team involvement
  - All 6 had involvement from the infectious diseases team for antibiotic therapy

# Findings

## Post operative infections (Cont'd)



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# Findings

## Antibiotics

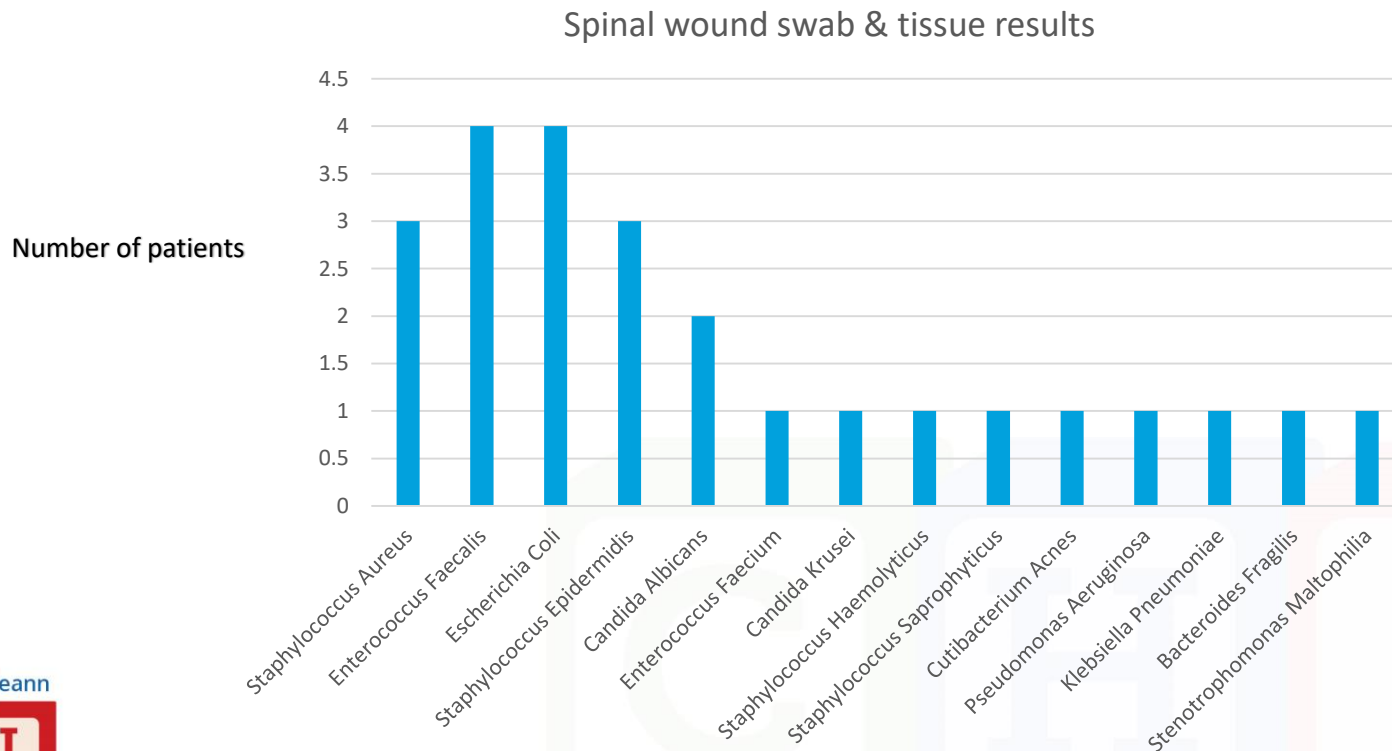
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- ▶ Antibiotics were applied directly to the wound intra-operatively in 4 instances (Vancomycin x3, Augmentin x1)
- ▶ All 11 patients received antibiotics on induction
  - IV Cefuroxime- 9
  - IV Gentamycin- 5
  - IV Cefazolin- 1
- ▶ Post-operative antibiotics (initially prescribed for between 24-48hours)
  - IV Cefuroxime- 9
  - IV Gentamycin- 2
  - IV Cefazolin- 1
  - IV Tazocin- 1



# Findings

## Microbiology commonalities



# Findings

## Non spinal positive microbiology during inpatient stay

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- ▶ Stool sample:
  - Norovirus x1
- ▶ Nasal pcr:
  - Covid x1
- ▶ Urine sample:
  - CRE x1
  - Escherichia Coli x1
  - Pseudomonas x1
  - Enterococcus Faecalis x1

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# Findings

## Metal work mechanical failure

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- ▶ Out of 11 patients
  - None had mechanical failure of metalwork resulting in metal work removal post surgery performed during review time frame
  - 1 had MAGEC rods inserted in 2017 which were removed during review time frame due to disconnection and migration into pelvis



# Findings

## Mortality rates

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- ▶ The Boston template requires mortality rates be recorded at 30 days and 1 year post operatively.
- ▶ At the time of this review there were no mortalities in this cohort of patients.

|                          |   |
|--------------------------|---|
| Mortality Rate @ 30 days | 0 |
| Mortality Rate @ 1 year  | 0 |

# Additional data

## Findings outside of the Boston Template

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- ▶ 5 of the 11 patients were cases presented pre operatively at MDT or Complex care meetings to discuss the role of surgery in their management
- ▶ Length of hospital stay directly correlated with number of returns to theatre, the 3 patients with the longest hospital stays also had the most returns to theatre
- ▶ All 11 patients had negative pre operative MRSA swabs- this includes all 6 who had post operative infections.
- ▶ Height was not routinely documented pre operatively.



# Points to consider

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- ▶ During the review of medical charts it was noted that knife to skin (KTS) time isn't routinely recorded, this was confirmed with theatre CNM2
- ▶ It may be beneficial to consider having KTS documented for all surgeries to allow for better analysis/review particularly from an infection control perspective.
- ▶ Pre operative height measurement would be beneficial for ascertaining impact of BMI on post operative recovery



# Conclusion

## Review Summary

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- ▶ 11 patients were identified as meeting the review criteria and were critically reviewed using the Boston template data points.
- ▶ Surgery breakdown: 8x spinal fusions, 1x growth rod insertion & 2x rod lengthening.
- ▶ Within this cohort, 6 had post operative infections & all of these had infectious diseases involvement.
- ▶ There were no mechanical failures resulting in removal of metalwork post surgery performed within the review time frame
- ▶ There were no deaths recorded by 1 year post op.

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