Te Whatu Ora
Health New Zealand

Candidates for Antenatal Spina Bifida Surgery

Wāhi Rua
New Zealand
Maternal
Fetal Medicine
Network

In babies with an antenatal diagnosis of myelomeningocele, antenatal surgery has been performed in order to potentially decrease the postnatal sequelae of spina bifida for baby. Antenatal repair lessens the exposure, and therefore damage, of the open spinal nerves to amniotic fluid with the hope of achieving better neurological function compared with no repair at all. This procedure does not provide a cure.

In Australasia this service is offered through the Mater Mothers Hospital in Brisbane, Australia. Access to this is via the High Cost Treatment Pool. Please read carefully the inclusion and exclusion criteria below.

Procedure and hospital admission (estimate) $NZD 30,000
Outpatient stay at Ronald McDonald House for patient and support person for 3 weeks (estimate) $NZD 5500

All enquiries should be directed to Dr Glenn Gardener, Clinical Director of MFM at Mater Mothers Hospital. This should be directed by the lead Senior Medical Officer for the case.
Dr Gardener can be contacted via:

Email: Glenn.Gardener@mater.org.nz
Phone: +61 404 467 844

Once the case is considered to be a potential candidate, a teleconference should be arranged to discuss the process, informed consent and for the family to ask any questions prior to transfer.
The teleconference should involve the patient and her family (whānau), clinical team (Senior Medical Officer, Fellow, Midwife co-ordinator) and the Brisbane MFM team. Other specialities that may want to be on the call include Paediatric Surgery and Neonatology.

Should the transfer to Brisbane go ahead the National Clinical Director of the NZMFMN (Dr Jay Marlow) will need to be involved for funding arrangements.
Dr Jay Marlow can be contacted by:

Email: jay.marlow@ccdhb.org.nz
Phone: +64 21 924945

Inclusion criteria (all criteria have to be met)

- Singleton pregnancy
- Spina bifida (myelomeningocele or myeloschisis) between T1-S1
- Evidence of Arnold-Chiari 2 malformation
- Lateral cerebral ventricles <15mm
- Normal microarray

Exclusion criteria

- Severe kyphosis
- Chromosomal defects
- Additional major structural anomaly
- Technical limitations to surgery
    - Maternal obesity BMI>35
    - Uterine fibroids will depend on placement and size
- Contraindication to surgery including previous hysterotomy in the active uterine segment.
- Elevated risk of preterm birth
    - Cervical length <15mm
    - Mullerian anomaly
    - Placenta previa
    - Previous history
- Psychological, socioeconomic or other factors that might prevent adherence to protocol

Prerequisites

- Ability to relocate to Brisbane, Australia for a minimum of three weeks.
- High-cost treatment pool will pay for flights, surgery and accommodation. Food, local transport and passports are to be paid for by patient/family.
- Current passport
- Normal microarray

Note: an antenatal MRI will be required. If performing locally please discuss with Dr Glenn Gardener first.

Potential Fetal benefits

- Less requirement for a VP shunt
    - Shunt criteria met 65% after fetal surgery vs 92% after PN surgery
    - Placement of shunt 40% vs 82%
- Higher chance of walking independently
    - Not walking 29% vs 43%
    - Walking with aids 29% vs 36%
    - Walking independently 42% vs 21%
- No difference in mortality
- Effects on bladder, bowel and sexual functions and mental capacity is unknown

Maternal risks

- Pulmonary oedema 5%
- Transfusion at delivery 9%
- Uterine scar at delivery :
    - Well healed 65%
    - Very thin 42%
    - Some dehiscence 9%
    - Complete dehiscence 2.3%

Fetal risks

- Oligohydramnios 20%
- Chorioamnion separation 33%
- Preterm delivery (43%)
    - <30 weeks 11%

  - 30-34^{6} 38%
  - 35-36^{6} 32%
  - >37 weeks 19%
  - Average GA at delivery 34^{4} weeks.
- Preterm prelabour rupture of membranes 44%
- Abruption 6.6%

Procedure

- Performed at 23^{0}-25^{6} weeks gestation
- Median laparotomy with extended excision above the umbilicus
- General anaesthetic and epidural
- Baby receives IM pancuronium and fentanyl sedation.
- Hysterotomy under cardiac monitoring using fetal echo
- Local for access is dependent on placental location
- Hysterotomy is performed while taking care to suture membranes to the uterine wall. Stapling device is used for bleeding control
- Spinal defect is expose and neurosurgical repair is performed by a neurosurgeon and plastic surgeon.
- The placode is covered by a cadaveric graft and by mobilised skin. To avoid tension with skin apposition it is often necessary to cover the lateral skin defect (s) by a graft of acellular dermis.
- Hysterotomy scar is then sutured carefully to reduce the risk of scar dehiscence.
- Surgical time approx. 3 hours, fetal surgical time 30-60min.

Post op: Australia

- In patient stay in Brisbane for 7 days. If no complications, to stay as an outpatient in Brisbane for a further one week. If well, can travel back to NZ.

Post-op: New Zealand

- Weekly outpatient checks
  - USS to assess: oligohydramnios, chorioamnion separation or scar dehiscence
- Inpatient if:
  - TPTL
  - PPROM
  - Severe chorioamnion separation close to the placental cord insertion
  - Oligohydramnios
    - Note: this can also be due to leakage from the hysterotomy site into the abdominal cavity
- If no complications LSCS at 37 weeks
- Access:
  - Into abdomen via previous scar.
  - To uterus via transverse lower segment if possible
- Hysterotomy defect
  - If not bleeding consider secondary repair at a later stage (lower risk of bleeding)
- Skin graft
  - If not on baby at birth SEARCH for it
  - The fetus will have a skin graft that does not need a special dressing. Underneath the graft epithelisation will occur. If this is complete the graft will fall off. It is white.
- Folllow-up for baby by usual spina bifida team
- Any future delivery will need to be a LSCS at 37 weeks.

All statistics are taken from:

- Adzick, NS, Thom EA, Spong CY, Brock III JW, Burrows PK, Johnson MP, Howell LJ, Farrell JA, Dabrowiak ME, Sutton LN, Gupta N, Tulipan NB, et al., for the MOMS Investigators. A Randomized Trial of Prenatal versus Postnatal Repair of Myelomeningocele. *N Engl J Med* 2011; 364:993-1004
- It is uncertain if these results will be generalised to patients that undergo fetal surgery at less experienced centres

Notes:

- If delivery occurs preterm in Australia there is reciprocal agreement in place which means neonatal care for the baby will be covered.
    - What is likely not to be covered:
        - Extended stay of the parents in Australia
        - Possibly transfer costs back to NZ

This document was created by Dr Jay Marlow with input from members of Wāhi Rua NZMFM Network and Dr Glenn Gardener, Mater Mothers Hospital, Brisbane. Endorsed in December 2022.

The most up to date version of this document can be found on Healthpoint, Wāhi Rua: New Zealand Maternal Fetal Medicine Network (NZMFM) webpages: https://www.healthpoint.co.nz/public/wahi-rua-new-zealand-maternal-fetal-medicine/