

MULTIDISCIPLINARY COLLABORATION AND LOGISTICS FOR COMBINED OBSTETRIC AND NEUROSURGICAL INTERVENTION.

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CASE PRESENTATION

A primiparous woman in her 35th week of pregnancy, presented to hospital with a three-week history of headache, unsteadiness and nausea. Her relevant history included triple negative breast cancer, treated three years previously with surgical resection and neoadjuvant chemoradiotherapy. Imaging revealed a cerebellar vermis lesion with acute obstructive hydrocephalus, likely to be metastatic disease. She was also found to have thrombi in her brachiocephalic and internal jugular veins.

She commenced dexamethasone, was transferred to the neurosurgical centre and started split dose anticoagulation. Over the following week, she underwent imaging, daily neurosurgical and regular obstetric, midwifery and anaesthetic review.

Despite steroids, her neurological symptoms progressed, necessitating emergent decompression. Following multidisciplinary planning, her anticoagulation was paused enabling a category 3 caesarean section under general anaesthesia, immediately followed by insertion of an external ventricular drain (EVD).

She had a straightforward caesarean section with minimal blood loss and delivery of a healthy infant. Following this, she underwent successful drainage of her hydrocephalus, facilitating extubation at the end of surgery.

After the initial surgery, arrangements were made for her to spend time with her baby and partner on the neurosurgical ward with regular involvement from the obstetric and midwifery teams, as well as her neurosurgical team.



CHALLENGES

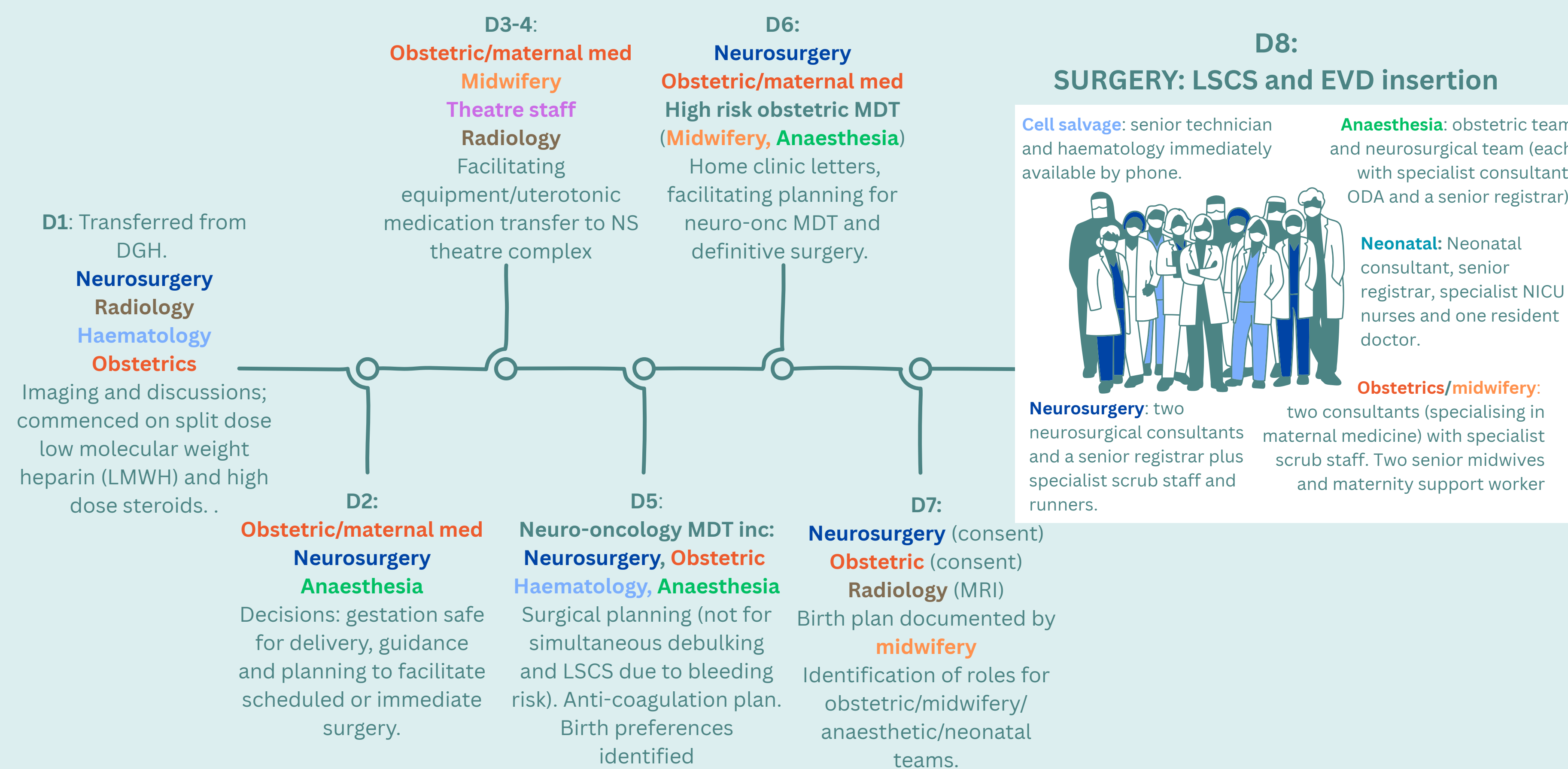
The case presented multiple areas of complexity and required close collaboration with many teams:

- Ensuring timely urgent neurosurgery whilst ensuring safe of delivery of fetus.
- The emergent nature of facilitating neurosurgical intervention and caesarean section in an unfamiliar site for many members of the operative team
- Facilitating synchronous working between different teams, unfamiliar with each other
- Balancing anticoagulation with proven thromboembolism and surgeries with high risk of and from bleeding.



COLLABORATION ACROSS SPECIALTIES

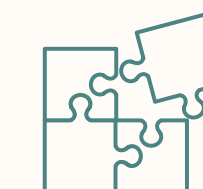
Throughout her stay, daily discussions and planning sessions were held across multiple specialities to facilitate safe and appropriately timed surgical intervention. See below, timeline of key interventions and specialties involved in care.



OUTCOMES

- The patient had an uneventful recovery from her initial surgery, with daily follow up by neurosurgery, midwifery and obstetrics. Definitive debulking of her cerebellar tumour occurred a week after her initial surgery (day 15). She was deemed medically fit for discharge with ongoing outpatient treatment (radiotherapy) ten days after this.
- The infant was born in good condition, and discharged into parental care four days after birth. A side room on the neurosurgical ward was made available to facilitate extended visiting hours (as tolerated by the patient).
- Anti-coagulation:
 - Prophylactic LMWH was paused 24h before surgery and restarted the day after.
 - She had an IVC filter fitted 2 days prior to her definitive posterior fossa surgery.
 - Prophylactic LMWH was commenced the day after her posterior fossa surgery (day 16) with a staged increase to therapeutic dosing during days 22-24. Regular neuro-observations and brain imaging were utilised to monitor for evidence of bleeding.

CASE REPRODUCED WITH WRITTEN PATIENT CONSENT



OVERCOMING CHALLENGES

- A risk of immediate emergency surgery remained present while anticoagulated, high dose dexamethasone was used to minimise oedema and the need for this. Surgical intervention occurred a week after admission to the tertiary centre, based on shared decision making between the MDT and the patient.
- Frequent multi professional meetings were held between various teams to facilitate collaborative working and plan for the safest outcome of mother and baby.
 - Prior to the target surgery date, equipment and uterotonic medications were transferred to the neurosurgery theatres.
 - Personnel planning included prior familiarisation of new theatre complex for members of the obstetric/midwifery team.
- Regular haematology input was required.
- Careful balance of risks were considered:

clot load +
pro-thrombotic
state

Risk of
bleeding into
tumour

 - Point of care testing of coagulation was performed immediately pre-op and cell-salvage was utilised intra-operatively. Regular brain imaging was undertaken after changes in anti-coagulation doses.
- Midwifery input commenced prior to CS date and continued post-operatively, facilitating early contact with her baby on the neurosurgical ward. On the day of surgery, allowance was made for her partner to be present in a relatives room within the theatre complex. Once the baby had been assessed by the neonatal team, they were taken to her partner.



LEARNING POINTS

- MDT discussion is vital to enable safe and successful collaborative surgery.
- EQUIPMENT:
 - Utility of standardised equipment list for deliveries outside usual maternity theatre complex (uterotonic medications taken in advance mislaid; specific pumps for oxytocin different to rest of theatres). SOP under development (e.g. a grab bag).
- HAEMATOLOGY:
 - In general, it takes at least 4 weeks of sustained therapeutic anticoagulation for the risk of embolism to drop and at least 3 months to normalise.
 - Cerebellar surgery is high risk for bleeding but intracerebral haemorrhage rates in patients with un-resected cerebral metastases are approx 10%.