

Concordance of magnetic resonance imaging with final diagnosis in Mullerian duct anomalies: A nineteen-year study between March 2003 to January 2022 from an Australian Quaternary Paediatric and Adolescent Gynaecology Centre.

Dr Divya Viswanathan¹, Dr Bridget Sutton², Dr Emma Borg³, Dr David Baartz¹, Dr Tapasi Bagchi¹, Professor Rebecca Kimble^{1,4}

¹ – Statewide Paediatric and Adolescent Gynaecology Service, Royal Brisbane & Women’s and Queensland Children’s Hospitals, Brisbane, QLD, Australia

² – Department of Medical Imaging, Royal Brisbane & Women’s Hospital, Brisbane, QLD, Australia

³ – Mater Mothers’ Hospital, Brisbane QLD, Australia

⁴ – University of Queensland, Faculty of Medicine, Brisbane, QLD, Australia

Background

Müllerian anomalies have an incidence of 1%. MRI is utilised as a diagnostic tool for Müllerian anomalies. MRIs are reportedly reliable in obtaining a diagnosis and correlate to clinical diagnosis in up to 78-100% of cases (1). Delineation from MRIs in assisting clinicians and patients largely justifies the costs associated with accessing MRI.

Objective

This study assesses the accuracy of MRI in diagnosis of Mullerian anomalies, and reports concordance and discordance with clinical, surgical and histological diagnosis.

Methodology

MRIs of patients with suspected Müllerian anomalies who presented to the Queensland Paediatric and Adolescent Gynaecology Statewide Service between March 2003 – January 2022 (19 years) were reviewed. MRI diagnosis was compared to clinical, surgical and histological findings. If MRI diagnosis aligned with clinical/surgical/histological diagnosis, concordance was met, or otherwise was reported as discordance. Uterine, cervical, and vaginal structures were assessed for concordance mutually exclusive of one another.

Results

A total of 102 cases were analyzed. Mean age at MRI was 17 yrs (age range 10-36). Surgery occurred in ~80% of cases. 37 cases had discordance of anatomical structures (single or multiple). Complete concordance is defined as concordance in all anatomical structures.

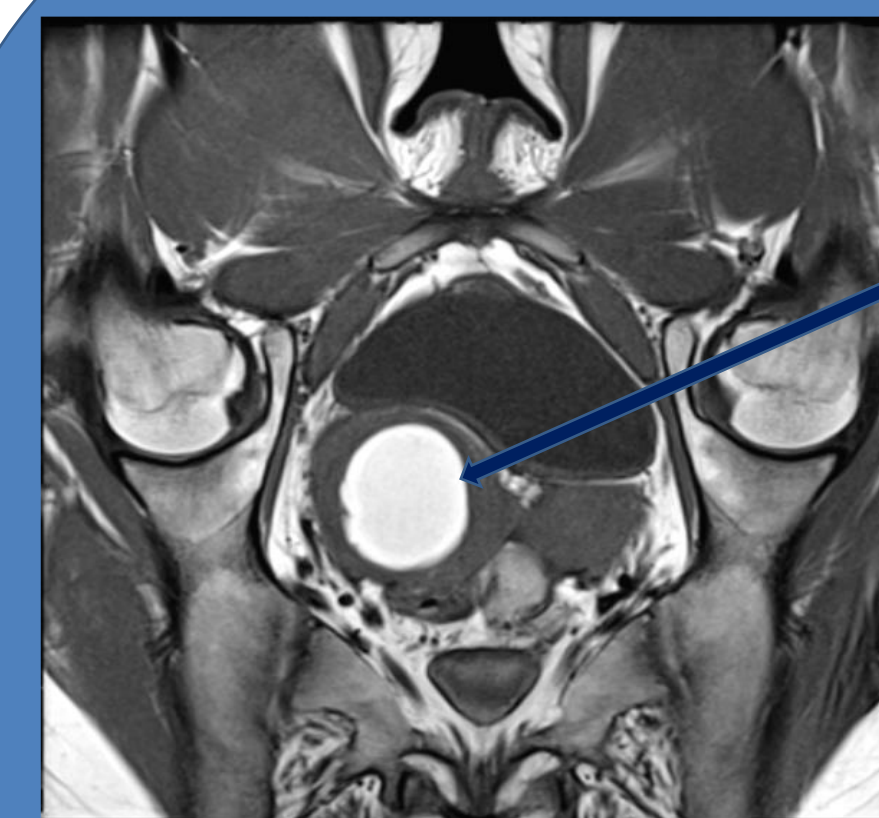
Concordance of MRI diagnosis with final diagnosis

Structure	Concordance
Final Diagnosis	65/102 (63.73%)
Uterine	98/102 (96.08%)
Cervical	84/102 (82.35%)
Vaginal	74/102 (72.55%)

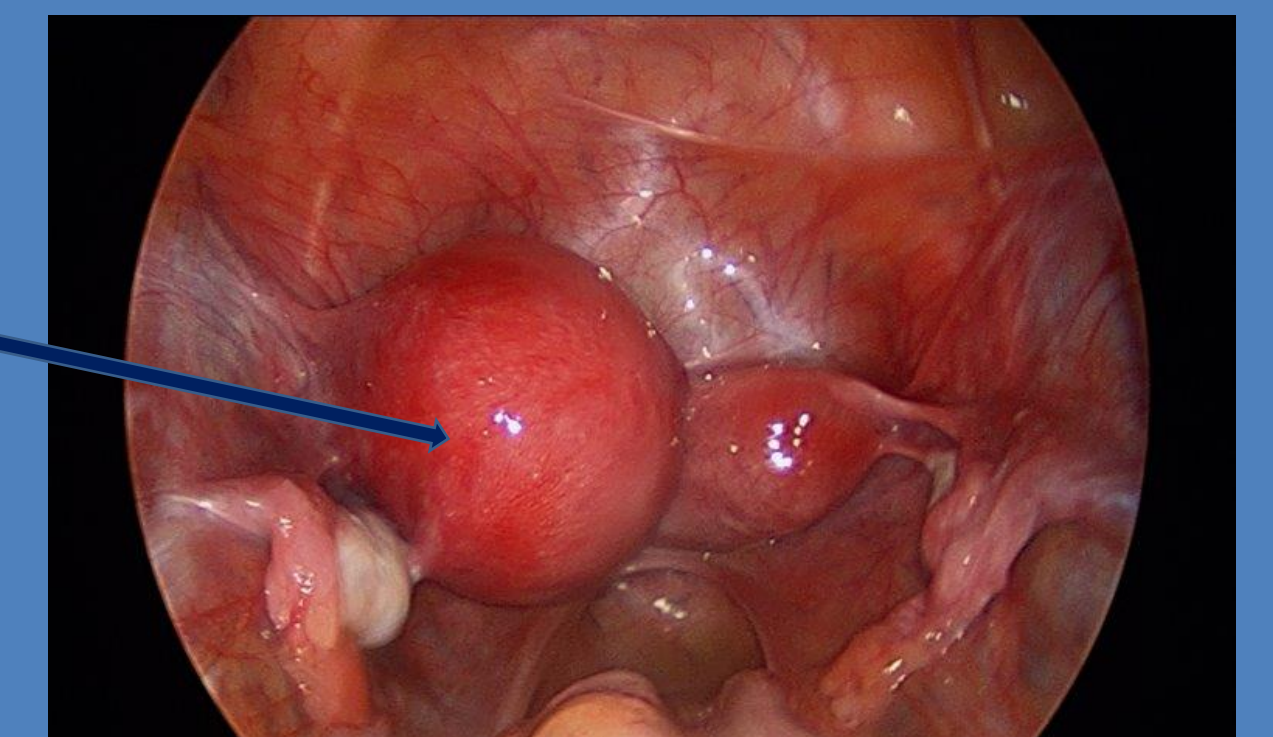
Discordant Cases as per Structural Category

Total Discordant	Structural Category	Percentage	Discordant Finding
37	Uterine (4/102)	3.92%	2 incorrect class reported 1 non-communicating uterine horn not reported
	Cervical (18/102)	17.65%	11 partial cervical agenesis not reported 2 two cervixes reported one cervix present 1 hypoplastic cervix reported - nil cervix present 2 with both/single cervical canals poorly visualised and unable to comment 1 septate cervical canal reported when not present.
	Vaginal (28/102)	27.45%	7 vaginal septa reported but not present 13 vaginal septa not reported but present 2 stenosed lower vaginal canal/stricture but not reported 3 blind ending vaginal canal not reported, vaginal canal difficult to visualise

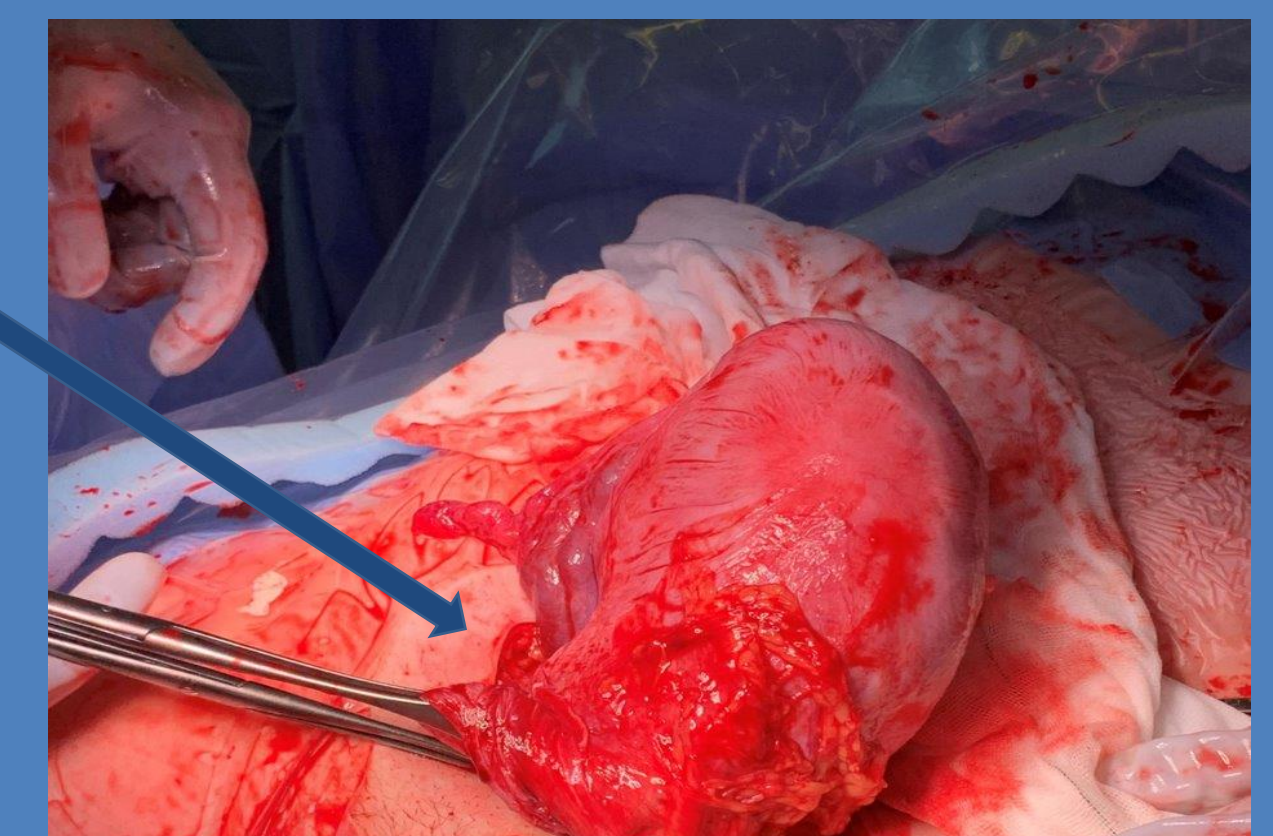
Type of anomaly	Cases (% of anomalies)	Vaginal Septum
I Hypoplasia/agenesis (MRKH)	27 (23%)	1
II Unicornuate	14 (12%)	0
III Didelphys Uterine didelphys, obstructed uteri/cervical aplasia OR TRIAD - Uterine didelphys, obstructed hemivagina, ipsilateral renal anomaly	25 (22%) (TRIAD 12)	19 (TRIAD 12)
IV Bicornuate	13 (11%)	8
Complete vaginal atresia	9 (8%)	0
High vaginal septum	6 (5%)	6
Vaginal stricture post surgery	4 (3%)	0
Lower vaginal anomaly	16 (14%)	9
Total	102 cases/115 anomalies	41 (of 115 anomalies – 35%)



Obstructed left functional, non-communicating (blind ending) hemi-uterus/rudimentary horn correlating on MRI and surgery.



Green Armitage on lower segment uterine incision, previous surgical site covered with omental adhesions.



An example of an MRI and surgical concordance in a unicornuate R uterus with an obstructed (haematometra) left functional, non-communicating horn. ASRM classification shown in bottom left photo. Post removal, this patient achieved a pregnancy delivering at K36+4 for PET via C-section, breech presentation and EFW on the 30% demonstrating it is possible for positive fertility outcomes in these patients (bottom right photo same unicornuate uterus at caesarean section).

Discussion & Conclusion

Concordance was most strongly correlated in uterine structures, followed by cervical and then vaginal. Larger structures are easily defined on MRI, in contrast to smaller, more compressible structures such as the vaginal canal. Discordance often occurred in externally sourced MRIs where contrast or vaginal gel was not utilized or available. Inter and intra-observer variation can occur with reporting radiologists given different techniques and reporting experience. This lends itself to the value of MDT approach. A radiologist with a special interest in PAG, along with a congenital contrast/gel protocol may improve visualization of these “hard to see” structures, which improves pre-operative diagnosis and surgical planning. This protocol has also evolved to appreciate the features of a cervix on MRI (ie endocervix, ectocervix defined by clearly seen posterior fornix using gel, versus an aplastic cervix). In summary, MRI is a valuable tool in defining Mullerian anomalies to improve counselling to families and offer surgical planning.

References

1. Troiano RN. Magnetic resonance imaging of Mullerian duct anomalies of the uterus. Topics in magnetic resonance imaging: TMRI. 2003; 14: 269-79.