

Performance of IOTA ADNEX and O-RADS in classifying adnexal masses in neonatal, pediatric and adolescent patients

A multicenter retrospective study

Paola Romeo^{1,2}, Francesca Moro^{1,3}, Filomena V. Paradiso⁴, Margherita Cuman^{1,5}, Tina Pasciuto⁶, Elena Teodorico¹, Giulia Zinicola¹, Caterina Mariotti⁷, Ivan P. Aloj⁸, Simone Frediani⁹, Alessandro Crocoli⁹, Andrea Conforti¹⁰, Anita Romiti¹¹, Leonardo Caforio¹¹, Lorenzo Nanni⁴, Antonia C. Testa^{1,12}



Background & objective

- Adnexal masses in neonatal, children and adolescents are rare and mostly benign, but preoperative characterization with validated ultrasound-based systems may be critical to guide surgical planning.
- **OBJECTIVE: to assess IOTA ADNEX and O-RADS performance for malignancy risk stratification in patients aged 0-18 years.**

Study design

- Retrospective multicenter observational study.
- Patients aged 0-18 years operated for adnexal masses from 2010 to 2024.
- Required: preoperative ultrasound images and histopathological diagnosis.
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- ADNEX model applied with 10% malignancy-risk threshold; O-RADS classified according to lexicon.



Final cohort by age / pubertal group

58 newborns 58/58 benign	78 pre-menarche 72 benign · 6 malignant	326 post-menarche 296 benign · 30 malignant
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Reference standard: histopathology after surgical removal.

Main results

462 surgical cases with ultrasound + histology	92.2% benign Lesions in all cases	7.8% malignant Lesions in all cases	0 malignancies in newborns
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Excellent agreement between the O-RADS and ADNEX models, particularly in the extreme-risk categories

O-RADS	LEXICON					
		O-RADS 2	O-RADS 3	O-RADS 4	O-RADS 5	Observed prevalence of malignancy (95% CI)
ADNEX model	O-RADS 2 ADNEX <1%	133	8	1	0	0/142 (0.0%) (0-0)
	O-RADS 3 ADNEX 1-10%	181	68	21	0	0/270 (0.0%) (0-0)
	O-RADS 4 ADNEX >10-50%	0	7	21	9	23/37 (62.2%) (46.5-77.8)
	O-RADS 5 ADNEX >50%	0	0	3	10	13/13 (100%) (100-100)
	Observed prevalence of malignancy (95% CI)	0/314 (0.0%) (0-0)	1/83 (1.2%) (-1.1-3.6)	16/46 (34.8%) (21-48.5)	19/19 (100%) (100-100)	462

Diagnostic performance

Method	Sensitivity	Specificity	NPV / Accuracy
ADNEX >10%	100%	96.7%	NPV 100%
O-RADS 4-5	97.2%	93.0%	NPV 99.7%
Expert assessment	88.9%	99.1%	Accuracy 98.3%
Original examiners	91.7%	56.3%	43.9% non-diagnostic

Original ultrasound reports were frequently non-diagnostic and less specific, despite high sensitivity.

Key message

- **Excellent agreement** between O-RADS Lexicon and ADNEX model for low- and high-risk categories (O-RADS 2 and 5).
- **The absence of false negatives with ADNEX and the very high NPV of both ADNEX and O-RADS** support their use to standardize preoperative assessment.

Interpretation & clinical relevance

- No neonatal malignancies were observed, supporting conservative behavior when imaging is reassuring.
- O-RADS 4 remained the main diagnostic grey zone and may need expert review / multidisciplinary discussion.
- Standardized IOTA terminology can reduce ambiguity in original reports.

Strengths

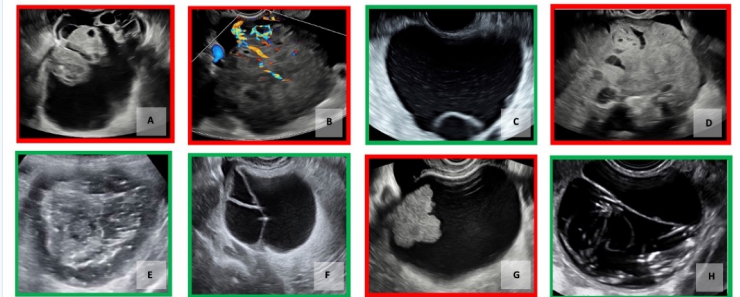
- Large sample size for a rare pediatric condition.
- Histological reference standard.
- Central expert image review.

Limitations

- Retrospective design.
- Surgical cohort only.
- Model performance needs prospective validation.

Conclusion

The IOTA ADNEX model and O-RADS lexicon demonstrated very high diagnostic performance for preoperative malignancy risk stratification in neonatal, pediatric and adolescent adnexal masses. Their systematic use may improve classification, support referral decisions, and help tailor management.



Representative ultrasound images of ovarian masses in pre-menarchal and post-menarchal patients. (A) Immature teratoma, (B) Ovarian metastasis from non-Hodgkin lymphoma, (C,E,F,H) Dermoid cysts, (D) Malignant mixed germ cell tumor with a yolk sac tumor component and an immature teratoma component, (G) Sero-mucinous borderline ovarian tumor.