


**THE IMPORTANCE OF MAGNETIC RESONANCE IMAGING IN THE DIAGNOSIS OF MATURE PELVIC TERATOMA TUMOR: CASE REPORT** <https://doi.org/10.56238/sevened2024.041-016>

**Anny Karoliny Silva Morais Siqueira<sup>1</sup>, Mayra Gabrielly Costa Pereira<sup>2</sup>, Italo Cavalcante Guedes<sup>3</sup>, Dagrimar Gomes da Silva<sup>4</sup>, Nathan Santos de Oliveira<sup>5</sup>, Lidia Pinheiro da Nóbrega<sup>6</sup>, Tatiana Lima Nunes<sup>7</sup>, José Bruno da Silva Leite<sup>8</sup>, Mário Vilar Trigueiro Neto<sup>9</sup>, Josué Brito Gondim<sup>10</sup>, Maria Expedita Rayssa Araújo da Silva<sup>11</sup> and Daniel Lopes Araújo<sup>12</sup>.**

**ABSTRACT**

Mature cystic teratoma of the ovary is the most common type of benign ovarian tumors in women. Its diagnosis is incidental most of the time, being carried out through imaging tests such as ultrasound, tomography and magnetic resonance imaging or during surgical procedures and its treatment varies according to the individual characteristics of the patient. The main objective is to analyze the importance of magnetic resonance imaging (MRI) in the accurate diagnosis of mature pelvic teratomas, contributing to the understanding of the efficacy of this imaging technique in the evaluation of this rare condition. This is a

<sup>1</sup> ORCID: <https://orcid.org/0009-0001-9128-3581>  
Centro Universitário de Patos-UNIFIP, Brazil  
E-mail: [annykarolinysilvamoraissiqueir@gmail.com](mailto:annykarolinysilvamoraissiqueir@gmail.com)

<sup>2</sup> ORCID: <https://orcid.org/0009-0006-2543-4042>  
Centro Universitário de Patos-UNIFIP, Brazil  
Email: [mayragabriellycosta@gmail.com](mailto:mayragabriellycosta@gmail.com)

<sup>3</sup> ORCID: <https://orcid.org/0009-0008-1357-3250>  
Centro Universitário de Patos-UNIFIP, Brazil  
E-mail: [italoguedes.c@gmail.com](mailto:italoguedes.c@gmail.com)

<sup>4</sup> ORCID: <https://orcid.org/0009-0004-1801-0300>  
Centro Universitário de Patos-UNIFIP, Brazil  
Email: [dagrimarygomes@gmail.com](mailto:dagrimarygomes@gmail.com)

<sup>5</sup> ORCID: <https://orcid.org/0009-0007-1469-679X>  
Centro Universitário de Patos-UNIFIP, Brazil  
E-mail: [nathanradio19@gmail.com](mailto:nathanradio19@gmail.com)

<sup>6</sup> ORCID: <https://orcid.org/0000-0003-2101-0438>  
Centro Universitário de Patos-UNIFIP, Brazil  
Email: [lidianobrega@fiponline.edu.br](mailto:lidianobrega@fiponline.edu.br)

<sup>7</sup> ORCID: <https://orcid.org/0009-0003-2186-414X>  
Centro Universitário de Patos-UNIFIP, Brazil  
Email: [esminharocha@hotmail.com](mailto:esminharocha@hotmail.com)

<sup>8</sup> ORCID: <https://orcid.org/0000-0003-3064-6534>  
Centro Universitário de Patos-UNIFIP, Brazil  
E-mail: [brunoleite82@gmail.com](mailto:brunoleite82@gmail.com)

<sup>9</sup> ORCID: <https://orcid.org/0009-0006-4395-5300>  
Centro Universitário de Patos-UNIFIP, Brazil  
E-mail: [marioneto@fiponline.edu.br](mailto:marioneto@fiponline.edu.br)

<sup>10</sup> ORCID: <https://orcid.org/0000-0002-8888-0932>  
Centro Universitário de Patos –UNIFIP, Brazil  
Email: [josuegondim@fiponline.edu.br](mailto:josuegondim@fiponline.edu.br)

<sup>11</sup> ORCID: <https://orcid.org/0009-0004-1035-3026>  
Centro Universitário de Patos-UNIFIP, Brazil  
Email: [rayssaaraujosilva587@gmail.com](mailto:rayssaaraujosilva587@gmail.com)

<sup>12</sup> ORCID: <https://orcid.org/0000-0002-1625-0368>  
Federal University of Campina Grande-UFCG, Brazil  
E-mail: [lopes.araujo@ufpe.br](mailto:lopes.araujo@ufpe.br)



descriptive study, with a qualitative approach, related to a case report being carried out at the University Center of Patos. And the sample of the proposal was formed by a female patient residing in the city of Patos, diagnosed with mature pelvic teratoma, at the time of diagnosis the patient was 16 years and 4 months old. It is concluded that the treatment to be chosen should consider individual characteristics of each patient, as well as the specific characteristics of the tumor, which varies according to each case. In the case report exposed, an MRI was performed that clearly demonstrated the problem and thus developed the most effective treatment plan.

**Keywords:** Cyst. MRI. Mature teratoma. Videolaparoscopy.



## INTRODUCTION

Mature ovarian teratoma, also known as a dermoid cyst, is a benign germ cell tumor, lined with epidermis and cutaneous appendages. They are congenital and usually asymptomatic, and are found in routine tests in women during childbearing age. It is also called a dermoid cyst, since in all tumors there are elements of the epidermis (Vieira *et al.*, 2014).

When an ovarian tumor is found, it is necessary to establish whether it is likely to be malignant or benign in order to clarify the decision about the surgical approach. And only through inspection of the abdominal cavity, cytological examination of the peritoneal fluid and histological examination of the surgical specimens can the diagnosis be established accurately (Vieira *et al.*, 2014).

It is important in the evaluation of women with gynecological symptoms, pelvic examination, such as pelvic ultrasonography and, especially, that performed by the transvaginal technique, which is the most used non-invasive method for morphological evaluation of the ovaries. It provides important information about the size and content of ovarian tumors. The main serum marker for ovarian epithelial tumors is CA 125 (a tumor marker that is measured in the blood) (Appel, 2009).

Ultrasound is one of the diagnostic methods for this tumor, and the combination of this with simple abdominal radiography provides a more complete diagnosis, and magnetic resonance imaging is a contribution to the differential and accurate diagnosis (Morais *et al.*, 2010).

Magnetic Resonance Imaging qualifies as a non-invasive exam, performing exams without the risks of ionizing radiation, it delivers images in three dimensions with excellent spatial and contrast resolution, making it possible to evaluate a tumor with great fidelity, increasing the spectrum of applications for all parts of the human body and exploring anatomical and functional aspects at the same time (Nougaret *et al.*, 2022).

Magnetic Resonance Imaging, being non-invasive and having high resolution, can be considered by some authors as the method of choice in the diagnosis or exclusion of ovarian pathology in children and adolescents. According to Carmo *et al.* (2021), among 11 patients with chronic abdominal pain, seven were diagnosed with mature ovarian teratoma by MRI and there was also 100% accuracy in locating ovarian lesions, placing Magnetic Resonance Imaging in a prominent place among imaging methods.

MRI has advantages over other methods, in addition to the good definition of the images, comparable or even superior in many cases to computed tomography, the absence



of exposure to ionizing radiation, which favors, above all, its use in risk groups, such as: children, pregnant women, the elderly, etc. (Nougaret *et al.*, 2022).

In this scenario, magnetic resonance imaging (MRI) is one of the main imaging tests in the diagnosis, evaluation and follow-up of pelvic diseases, capturing detailed images of the anatomy and enabling the correct evaluation of the presence, location, morphology and extent of probable pelvic lesions and tumors, presenting important potential to identify various pathologies (Ashby *et al.*, 2021).

This method usually requires more time to obtain the images, as well as costly, because the devices used are expensive, in addition to the requirement of qualified labor to operate them, both for the radiology services that offer it and for the patients who use it. Also, because it is a less available method in the SUS - Unified Health System, than other more common, although more limited, methods such as X-ray, Ultrasonography and Computed Tomography. If well indicated and well used, they can eliminate the need for invasive procedures or surgery (Boaventura *et al.*, 2017).

In view of the current medical importance and the need for more understanding of mature pelvic teratoma, this study aims to understand the indications and benefits of Magnetic Resonance Imaging (MRI) within the broad spectrum of the pathology. As well as to understand that even with the availability of other means of detection, such as ultrasonography and computed tomography, Magnetic Resonance Imaging (MRI) overlaps these methods because it is broader and more effective in the diagnosis of various pathologies, offering a more comprehensive and detailed evaluation of the extent of the tumor and its morphological characteristics.

In this context, the main objective of this case report is to analyze the importance of magnetic resonance imaging (MRI) in the accurate diagnosis of mature pelvic teratomas, contributing to the understanding of the efficacy of this imaging technique in the evaluation of this rare condition. And as specific objectives to analyze the contribution of magnetic resonance imaging in the identification of adjacent structures affected by pelvic teratomas, providing essential information for surgical planning and patient prognosis, and to investigate the sensitivity and specificity of magnetic resonance imaging in detecting recurrences or complications related to mature pelvic teratomas, after therapeutic interventions, highlighting its role in the follow-up of these patients.

## **METHODOLOGY**

The present study was a descriptive study, with a qualitative approach, related to a case report, (Pereira *et al.*, 2018; Toassi & Petry, 2021), which sought to analyze the



importance of magnetic resonance imaging (MRI) in the accurate diagnosis of mature pelvic teratomas. The study was carried out at the University Center of Patos - UNIFIP, located in the Paraíba hinterland at Horácio Nóbrega Street, S/N - Belo Horizonte in the city of Patos - PB.

The sample of the proposal was formed by a female patient living in the city of Patos, in the state of Paraíba, diagnosed with mature pelvic teratoma, at the time of diagnosis the patient was 16 years and 4 months old.

Considering that the patient herself acted as a researcher in the case report, there are risks to be considered, including self-presentation bias, limited generalization, conflict of interest, and ethical issues. These risks can compromise the accuracy, completeness, and validity of the research results. To mitigate these risks, the patient/researcher adopted rigorous research practices, was transparent about her dual role, sought external feedback, and followed established ethical principles for research involving human subjects.

Direct experience offers an intimate and empathetic understanding of the condition or phenomenon being studied, allowing for richer storytelling and deeper analysis. The personal perspective can reveal nuances that might otherwise go unnoticed by outside researchers. In addition, active participation in research increases the authenticity and relevance of the results. By taking on these dual roles, it has helped to promote a more patient-centered approach to research and clinical practice, as well as contributing to greater awareness and understanding of the condition or phenomenon in question.

This study considered Resolution No. 466/2012 of the National Health Council, which governs the ethics of research involving human beings directly or indirectly, ensuring the guarantee that the privacy of the research subject will be preserved. It is worth noting that the research began only after analysis and approval by the Research Ethics Committee.

## RESULTS

Female patient, aged 16 years, who at the time had incomplete high school, single marital status, born in the city of Patos-PB, with no family history of cancer. In 2021, symptoms similar to those of pregnancy appeared, such as: nausea, nausea, torture, lack of appetite, abdominal and sexual discomfort.

A gynecological medical appointment was scheduled at a private clinic in the city of Patos-PB, the doctor performed a cytological exam, on February 5, 2021, as well as prescribed a IUMI contraceptive drug and requested a transvaginal one, performed on February 22, 2021.

The diagnostic impression of the transvaginal sample showed an echogenic formation in the right ovary that may be related to a cyst with hemorrhagic content, not excluding the possibility of tumor of the dermoid lineage. The doctor suggested that an ultrasound control be performed after 40 days for follow-up and diagnostic definition. Soon after this episode, other medical opinions on the case were sought. In the city of João Pessoa – PB, the gynecologist referred for an MRI with the use of contrast.

Magnetic resonance imaging demonstrated a nodule in the right ovary suggestive of teratodermoid origin and its histological variants.

On March 11, 2021, the patient sought another medical suggestion, in the city of Sousa-PB, where he explained in a more humane way about the involvement of this type of tumor and its form of treatment.

Being referred for laboratory tests, surgical risk and search for blood donors, approximately after 15 days, a faster and more effective type of surgery called videolaparoscopy was performed.

Below is the result of the MRI performed.

Figure 1 - Magnetic resonance imaging results requested to visualize a nodule in the right ovary suggestive of teratodermoid, using intravenous contrast and vaginal gel.

#### RESSONÂNCIA MAGNÉTICA DE PELVE

**Protocolo:** Sequências multiplanares FSE e GRE ponderadas em T1 e T2, antes e após a injeção endovenosa de contraste paramagnético. Utilizado gel vaginal.

#### Relatório:

Bexiga com paredes finas e conteúdo líquido homogêneo.

Útero em anteversoflexão, de dimensões normais e contornos preservados. Mede cerca de 7,3 x 4,2 x 3,0 cm, com volume estimado em 47,8 cm<sup>3</sup>.

Miométrio com sinal homogêneo, sem nódulos identificáveis.

Endométrio e zona juncional com espessuras normais.

Região retrocervical, septo retovaginal, recesso vesicouterino e parede anterior do retossigmóide livres.

Ovário direito tópico, de dimensões normais, apresentando lesão focal sólida, heterogênea com componente de gordura identificado pela queda do sinal na sequência fora de fase, medindo 1,7 cm.

Ovário esquerdo tópico, de dimensões e sinal preservado.

Ausência de linfonomegalias ou de líquido livre na pelve.

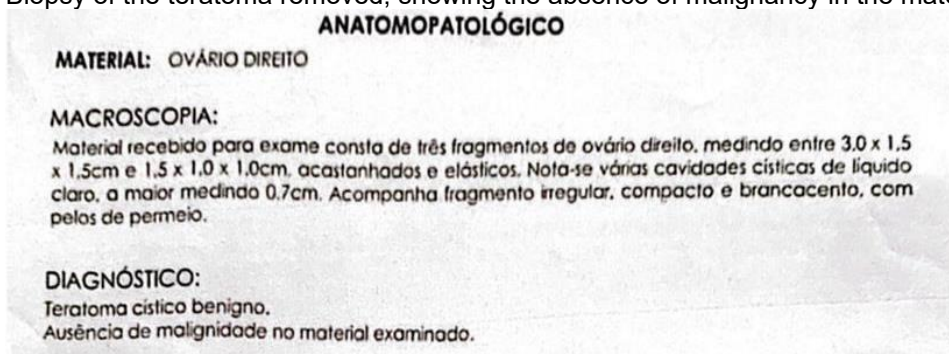
#### Impressão diagnóstica:

Nódulo no ovário direito sugestivo de origem teratodermóide e suas variantes histológicas.

Source: The Authors.

Below is the biopsy result of the teratoma removed.

Figure 2 - Biopsy of the teratoma removed, showing the absence of malignancy in the material examined.



Source: The Authors.

## DISCUSSION

Due to its complex embryological development, the ovary can give rise to tumors of varied histology and with different behaviors. Among these tumors, we have those derived from germ cells. Also known as a dermoid cyst, mature ovarian teratoma is a benign neoplasm that derives from these germ cells that have tissues from the three embryonic leaflets: ectoderm, mesoderm, and endoderm (Bersot & Rymysza, 2021).

According to data from Hernández and Reina (2012), most of these germ cell neoplasms are benign, although some are cancerous and can be fatal. In general, they have a good prognosis, with more than nine out of 10 patients surviving at least five years after diagnosis. It can be found in all age groups, and in childhood and adolescence it can be associated with ovarian torsion.

Given that neoplasms in the pediatric population have distinct characteristics compared to those in adults, it is crucial that radiologists become familiar with the variations in ultrasonographic, tomographic, and magnetic resonance imaging findings related to ovarian neoplasms. These imaging findings play a key role in the investigation of these conditions (Lala & Strubel, 2019).

In the present study, it was identified that the patient underwent cytological exams and transvaginal ultrasonography before undergoing magnetic resonance imaging. According to Carmo et al. (2021), the diagnosis of cystodermoid is often made through a routine pelvic or abdominal ultrasound, in which whitish tissue is visualized in the ovary. It is rare to find a palpable tumor abdominally, but cases of giant tumors have been reported, due to the rapid growth and late consultation of the patient. In addition, magnetic resonance imaging has a high diagnostic performance.

The introduction of new MRI techniques has allowed the functional analysis of the structures and various physiological processes present in the tumor microenvironment (Higgins & Pomper, 2011). Corroborating these authors, Histed; Lindenberg; Mena, et al., (2012) and González Hernando C; Esteban L, et al., (2010), raise issues in which magnetic



resonance imaging (MRI) is currently a widely recognized diagnostic imaging technique in clinical practice, although it is still constantly evolving. With regard to the analysis of neoplasms, MRI is capable of providing relevant morphological data, such as dimensions, shapes, number of lesions, presence of edema and necrosis, interaction with neighboring structures, and characteristics related to the use of intravenous contrast.

Teratomas contain elements from all three germ layers, making their ultrasound imaging (US) varied. Most have a cystic appearance, however, they may have a solid component. On ultrasound, it presents the presence of high-amplitude, diffuse or focal echoes, an area of attenuation of the posterior acoustic beam, and the visualization of hyperechogenic lines and points within the mass. These heterogeneous findings translate the presence of calcified tissues, similar to bones and teeth, hair, and fatty tissue (Braun & Meloni, 2022).

Diagnosis is commonly incidental through imaging tests or during surgical procedures (Chisholm & Levine, 2016). Corroborating this author, we have Sampaio et al. (2016), "computed tomography and magnetic resonance imaging offer a high sensitivity to fat and calcifications, which are important characteristics of dermoid teratoma".

## CONCLUSION

With the study analyzed, it was possible to conclude that the treatment to be chosen should consider individual characteristics of each patient, as well as the specific characteristics of the tumor, which varies according to each case. In the case report exposed, an MRI was performed that clearly demonstrated the problem and thus developed the most effective treatment plan.

For this reason, future studies should explore diversity in imaging tests for the detection of mature ovarian teratoma. In addition, research on this neoplasm and its best diagnostic methods becomes essential to develop more personalized and effective therapeutic approaches.

## ACKNOWLEDGMENTS

We thank everyone who directly or indirectly contributed to the realization and success of this article.





## REFERENCES

1. Appel, M., et al. (2009). Rastreamento e diagnóstico do câncer de ovário. *Revista da AMRIGS*, 53(3), 313-318.
2. APA. (2023). Orientações para elaboração de citações e referências: Conforme a American Psychological Association (APA) (7th ed.). (F. M. de Souza e Silva, Ed.). Belo Horizonte, Brazil: PUC Minas. Available at <https://www.pucminas.br/biblioteca/DocumentoBiblioteca/APA-7-Edicao.pdf>. Retrieved on February 14, 2025.
3. Ashby, K., Adams, B., & Shetty, M. (2021). Appropriate magnetic resonance imaging ordering. In *StatPearls*. StatPearls Publishing. Available at <https://www.ncbi.nlm.nih.gov/books/NBK567802/>
4. Bersot, T. G., & Rymsza, T. (2021). Teratoma maduro de ovário em gestante – um relato de caso. *Revista Thêma et Scientia*, 11(1). Available at <https://themaetscientia.fag.edu.br/index.php/RTES/article/view/1258>. Retrieved on February 14, 2025.
5. Boaventura, C., et al. (2017). Evaluation of the indications for performing magnetic resonance imaging of the female pelvis at a referral center for cancer, according to the American College of Radiology criteria. *Revista Radiologia Brasileira*, 50, 1-6.
6. Braun, M. M., & Meloni, I. (2022). Teratoma maduro: O papel da ultrassonografia no seu diagnóstico diferencial – relato de caso. *Brazilian Journal of Health Review*, 5(4), 17105-17112.
7. Brasil. (2012). Resolução No 466, de 12 de dezembro de 2012. Dispõe sobre diretrizes e normas regulamentadoras de pesquisa envolvendo seres humanos. *Diário Oficial da União*. Brasília, DF.
8. Carmo, M. D., et al. (2021). Teratoma maduro de ovário em uma adolescente. *Residência Pediátrica*, 11(1), 1-4.
9. Chisholm, A., & Levine, E. M. (2016). Mature cystic teratoma of the ovary (Record No. 115294). In *DynaMed Plus*. Ipswich, MA: EBSCO Information Services. Available at <http://www.dynamed.com/login.aspx?direct=true&site=dynamed&id=115294>. Retrieved on February 14, 2025.
10. González Hernando, C., et al. (2010). The role of magnetic resonance imaging in oncology. *Clinical and Translational Oncology*, 12, 606-613.
11. Hernández, Y. C., & Reina, Z. A. (2012). Teratoma de ovario. *Presentación de un caso. Medisur*, 10(2), 144-150.
12. Higgins, L. J., & Pomper, M. G. (2011). The evolution of imaging in cancer: Current state and future challenges. *Seminars in Oncology*, 38, 3-15.
13. Histed, S. N., et al. (2012). Review of functional/anatomical imaging in oncology. *Nuclear Medicine Communications*, 33, 349-361.



14. Lala, S. V., & Strubel, N. (2019). Ovarian neoplasms of childhood. *Pediatric Radiology*, 49(11), 1463-1475.
15. Morais, F. P., et al. (n.d.). Teratoma maduro ovariano bilateral: Relato de caso. *Brasília Médica*, 47(1). Available at <https://pesquisa.bvsalud.org/portal/resource/pt/lil-545708>. Retrieved on February 14, 2025.
16. Nougaret, S., et al. (2022). MRI in female pelvis: An ESUR/ESR survey. *Insights into Imaging*, 13(1), 1-11.
17. Pereira, A. S., et al. (2018). *Metodologia da pesquisa científica [e-book]*. Editora da UFSM.
18. Sampaio, J., et al. (2016). Mature cystic teratoma of ovary with abnormally high levels of CA19-9: A case report. *Revista Brasileira de Ginecologia e Obstetria*, 38, 365-367.
19. Toassi, R. F. C., & Petry, P. C. (2021). *Metodologia científica aplicada à área da saúde (2nd ed.)*. Editora da UFRGS.
20. Vieira, L. C., et al. (2014). Cistectomia via laparoscópica com preservação do tecido ovariano em teratoma maduro de ovário: Relato de caso. *Arquivos Catarinenses de Medicina*, 43(3), 73-75.