

## Multiseptated Gallbladder in a Three-Month-Old Puppy: A Case Report

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### ABSTRACT

Multiseptated gallbladder (MSG), also known as “honeycomb gallbladder,” is a rare biliary anomaly well documented in human medicine but infrequently reported in dogs. This report describes the imaging features of MSG in a three-month-old, intact female German Shepherd Dog. The patient was clinically asymptomatic, with hematological and biochemical findings within normal limits. Abdominal ultrasonography (USG) demonstrated multiple curvilinear echogenic septa within the gallbladder lumen, producing a characteristic honeycomb-like pattern. Further evaluation with contrast-enhanced computed tomography (CT) confirmed the presence of numerous septal structures extending from the gallbladder wall into the lumen. In addition, small hyperattenuating foci consistent with choleliths were detected. Considering the patient’s young age and the absence of clinical and laboratory abnormalities, the findings were interpreted as most consistent with a congenital anatomical variation. This case emphasizes the importance of recognizing rare congenital gallbladder anomalies in young dogs and highlights the complementary value of advanced imaging techniques, particularly USG and CT, in the detailed assessment of atypical hepatobiliary conditions.

**Keywords:** honeycomb gallbladder, ultrasonography, computed tomography, dog

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## Introduction

Symptomatic gallbladder malformations are rare in both dogs and cats; therefore, anatomical disorders of the gallbladder are most commonly identified incidentally at necropsy (Ergin et al. 2013). Multiseptated gallbladder (MSG), also referred to as “honeycomb gallbladder,” is a rare biliary anomaly first described by Knetsch (1952), with fewer than 150 cases reported worldwide in human medicine (Terkawi et al., 2021). MSG is characterized by multiple thin septa traversing the gallbladder lumen,

creating a honeycomb-like appearance on imaging (Yamamichi et al., 2025).

The etiology of MSG remains incompletely understood, and several embryological hypotheses have been proposed. Congenital MSG is thought to result from outpouching of the gallbladder wall into the lumen, forming septa that contain muscular fibers, whereas acquired forms lack muscular components within the septal structures. Although many human cases are diagnosed incidentally, others present with a variety of clinical signs, and occasional

associations with other pancreaticobiliary developmental anomalies have been reported (Terkawi et al., 2021).

In veterinary medicine, septate gallbladder has been reported only in a limited number of dogs, and descriptions of true multiseptated morphology are even rarer (Lange and Beaudu-Lange, 2018).

To the authors' knowledge, only three reports describing septate or multi-septate gallbladder in dogs are currently available in the veterinary literature. Choi et al. (2020) reported a 5-year-old Yorkshire Terrier presented with acute vomiting and diarrhea. Imaging revealed an abnormally divided gallbladder with wall thickening and a tortuous common bile duct containing hyperechoic material. Following failure of conservative management, cholecystectomy was performed, and intraoperative findings confirmed partial division of the gallbladder by a septum communicating with the cystic duct. Mircean et al. (2008) described an incidental finding of a septate gallbladder in a 12-year-old female Cocker Spaniel, suggesting that this congenital anomaly may remain clinically silent. Additionally, Lange and Beaudu-Lange (2018) described six 2-month-old Bull Terrier puppies from the same litter presenting with hyperechogenic septa within the gallbladder, producing a honeycomb appearance on ultrasonography. During follow-up, the puppy with the prominent septation developed cholecystitis and a gallbladder abscess with cholelithiasis.

These limited reports suggest that septate gallbladder in dogs may be either an incidental congenital anomaly or associated with secondary inflammatory or obstructive biliary disease. However, due to the scarcity of documented cases, the developmental origin and clinical relevance of septal gallbladder anomalies in dogs remain unclear.

## Case

A three-month-old, 10-kg, intact female German Shepherd Dog was referred to Istanbul University-Cerrahpaşa Veterinary Faculty Research and Practice Animal Hospital Department of Radiology for an ultrasound examination as part of a routine check-up. The patient was clinically stable at presentation. Complete blood count and blood serum biochemical parameters were detected between reference ranges (Table 1).

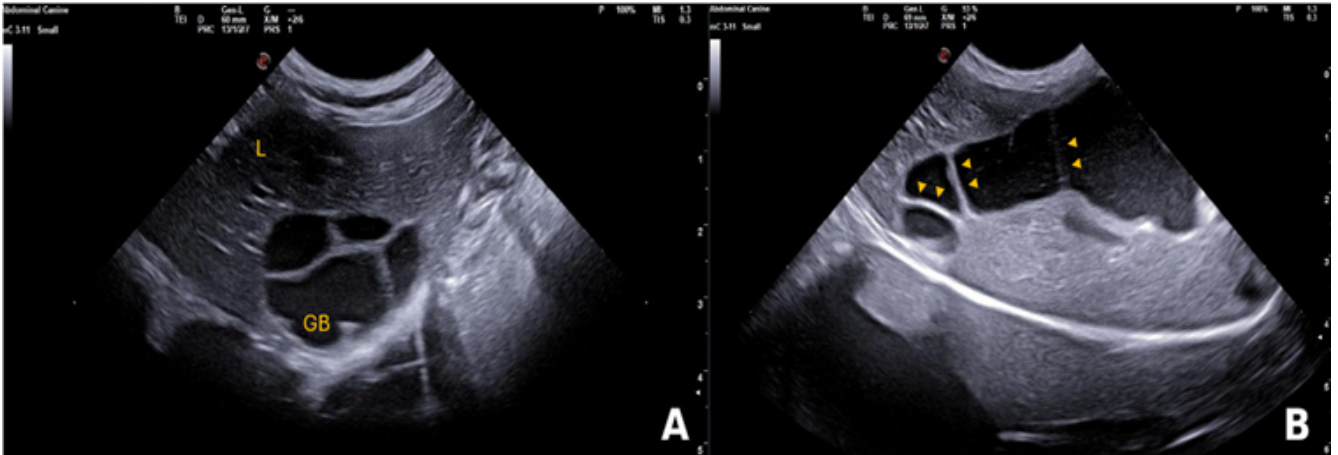
Abdominal ultrasonography revealed a distended gallbladder with anechoic content and normal wall thickness. No sludge was detected; however, distinct

thin internal curvilinear echogenic lines extending within the lumen were observed, suggestive of septal formations (Figure 1). An abdominal CT scan was recommended for a definitive diagnosis.

**Table 1.** Complete blood count (CBC) and blood serum biochemical parameters of the patient.

Parameter	Lab. Value	Ref. Range
WBC (x 10 <sup>9</sup> /L)	13.40	6.00-17.00
Baso (x 10 <sup>9</sup> /L)	0.048	0.00-0.12
Baso (%)	0.36	0.00-1.30
Neu(x 10 <sup>9</sup> /L)	10.091	3.62-11.32
Neu (%)	75.30	52.00-81.00
Eos (x 10 <sup>9</sup> /L)	0.075	0.04-1.56
Eos (%)	0.56	0.50-10.00
Lymph (x 10 <sup>9</sup> /L)	1.353	0.83-4.69
Lymph (%)	10.10	12.00-33.00
Mono (x 10 <sup>9</sup> /L)	1.833	0.14-1.97
Mono (%)	13.68	2.00-13.00
RBC (x 10 <sup>12</sup> /L)	7.60	5.10-8.50
HGB (g/L)	18	11.00-19.00
MCV (fL)	66.2	62.00-78.00
MCH (pg)	23.6	21.00-28.00
MCHC (g/dL)	35.7	30.00-38.00
HCT (%)	50.3	36.00-56.00
PLT (x 10 <sup>9</sup> /L)	455	117-460
ALB (g/L)	30.4	23-40
GLOB (g/L)	25.6	19-45
TP (g/L)	56.0	49-82
ALT (U/L)	51	5-125
AST (U/L)	11	0-50
ALP (U/L)	178	17-212
GGT (U/L)	2	0-10
BUN (mmol/L)	5.8	2.5-9.6
CREA (µmol/L)	52.6	28-150
PHOS (mmol/L)	1.5	0.81-2.19
CK (U/L)	120	10-200
TB (µmol/L)	0.1	0-15
Ca (mmol/L)	2.74	1.98-3.0
LDH (U/L)	54	40-400
GLU (mmol/L)	7.13	4.11-7.94

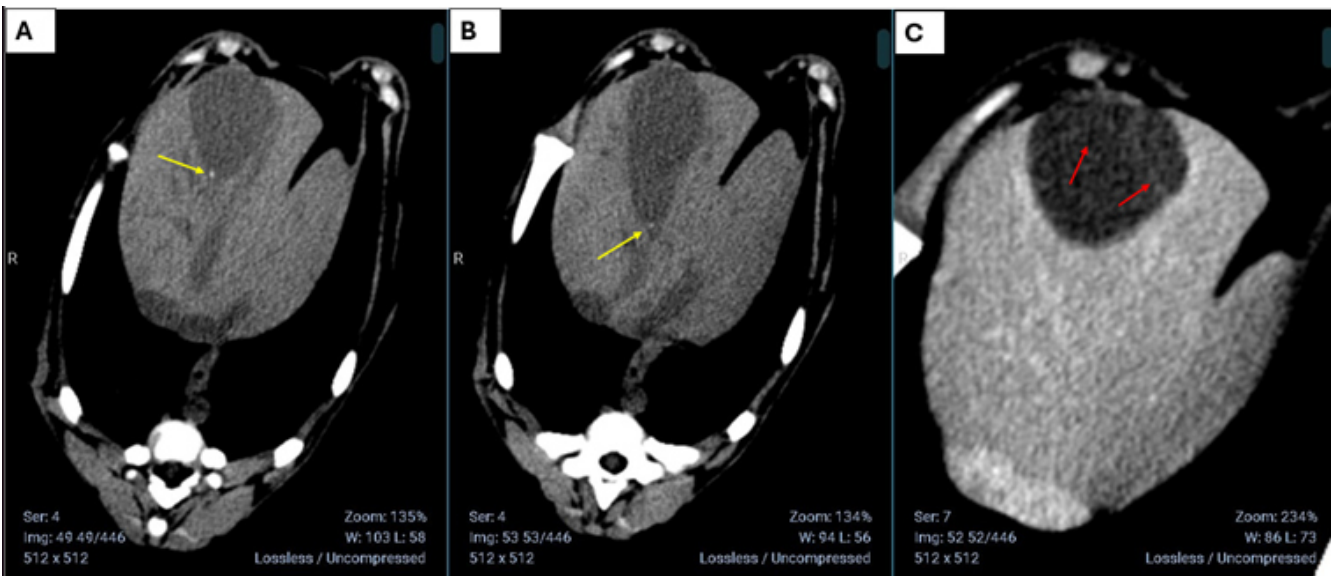
WBC: White Blood Cell, Baso: Basophil, Neu: Neutrophil, Eos: Eosinophil, Lymph: Lymphocyte, Mon: Monocyte, RBC: Red Blood Cell, HGB: Hemoglobin, MCV: Mean Corpuscular Volume, MCH: Mean Corpuscular Hemoglobin, MCHC: Mean Corpuscular Hemoglobin Concentration, HCT: Hematocrit, PLT: Platelet. ALB: Albumin, GLOB: Globulin, TP: Total Protein, ALT: Alanine Aminotransferase, AST: Aspartate Aminotransferase, ALP: Alkaline Phosphatase, GGT: Gamma-Glutamyl Transferase, BUN: Blood Urea Nitrogen, CREA: Creatinine, PHOS: Phosphorus, CK: Creatine Kinase, TB: Total Bilirubin, Ca: Calcium, LDH: Lactate Dehydrogenase, GLU: Glucose.



**Figure 1.** Ultrasonographic findings. **(A)** Transverse (short-axis) ultrasonographic image showing the septa forming a honeycomb-like appearance, consistent with a multiseptated gallbladder (GB) and liver (L), **(B)** Longitudinal (long axis) ultrasonographic image of the gallbladder demonstrating multiple internal curvilinear echogenic septa (arrowheads) within the anechoic lumen.

Contrast-enhanced abdominal computed tomography confirmed the presence of internal septal structures within the gallbladder lumen, extending from the wall toward the lumen at the fundic region. Additionally, two small (1–2 mm)

spontaneously hyperattenuating foci consistent with choleliths were identified within the gallbladder lumen. The hepatic parenchyma, particularly in the left lobe, demonstrated a heterogeneous contrast enhancement pattern (Figure 2).



**Figure 2.** **(A, B)** Pre-contrast series of contrast-enhanced abdominal computed tomography images demonstrating small hyperattenuating foci (yellow arrows) within the gallbladder lumen, consistent with choleliths. **(C)** Post-contrast CT image showing thin linear septal structures (red arrows) extending from the gallbladder wall toward the lumen, consistent with a multiseptated gallbladder morphology.

## Discussion

The liver develops embryologically from the hepatic diverticulum, which differentiates into the pars hepatica (cranial portion) and the pars cystica (caudal portion). The gallbladder and common bile duct originate from the pars cystica (Causey et al., 2010).

During development, the pars cystica initially forms as a solid structure that subsequently undergoes vacuolization to create a hollow lumen. This lumen then expands through epithelial proliferation followed by recanalization. Abnormalities in the vacuolization or recanalization process have been

suggested as potential causes of septal formation within the gallbladder (Mahato, 2010).

Several embryological mechanisms have been proposed to explain the development of MSG. Simon and Tandon (1963) hypothesized that anomalies in the vacuolization process may lead to septum formation. Similarly, Bhagavan et al. (1970) suggested that disproportionate growth of the solid embryonic gallbladder relative to its surrounding bed and peritoneum may result in abnormal folds and septations. In addition, congenital MSG has been proposed to arise from an outpouching of the gallbladder wall into the lumen, resulting in septa containing muscular fibres, whereas acquired forms lacking muscular components within the septal walls have also been described (Terkawi et al., 2021). Furthermore, MSG has occasionally been associated with other congenital anomalies of the pancreaticobiliary system.

In veterinary medicine, developmental anomalies have also been proposed as an explanation for septated gallbladder morphology. For example, the presence of septal formations in all puppies from the same litter reported by Lange and Beaudu-Lange (2018) supports a developmental origin. In this case, the patient's very young age, along with the lack of clinical signs, inflammatory changes, or biochemical abnormalities, supports the view that the septated gallbladder is most likely a congenital anatomical variation. Such anomalies may remain clinically silent and are often detected incidentally during imaging examinations in human medicine (Terkawi et al., 2021; Faraj et al., 2024).

Ultrasonography is generally considered sufficient for the diagnosis of MSG. However, additional imaging modalities such as computed tomography (CT), magnetic resonance cholangiopancreatography (MRCP), and endoscopic retrograde cholangiopancreatography may be used to further characterize gallbladder morphology and confirm the diagnosis (Karaca et al., 2011). In the present case, septal structures were initially suspected on ultrasonographic examination and subsequently confirmed using contrast-enhanced CT. While ultrasonography remains the primary imaging modality for evaluation of the gallbladder in veterinary patients, CT can provide additional information regarding gallbladder morphology and associated hepatobiliary structures. In this case, CT enabled clearer visualization of internal septal

structures and facilitated detection of small hyperattenuating foci consistent with choleliths. Therefore, advanced imaging modalities such as CT may contribute to a more comprehensive characterization of unusual gallbladder morphology in dogs.

Several conditions should be considered in the differential diagnosis of a septated or multiseptated gallbladder. Gallbladder mucocele with a septal-like appearance and certain forms of emphysematous cholecystitis may mimic a septated gallbladder on imaging. In addition, Lee et al. (2009) described a pseudo-diverticulum of the gallbladder associated with cholelithiasis that resembled a multiseptated gallbladder. Desquamated gallbladder mucosa and hyperplastic cholecystitis should also be considered. On ultrasonographic examination, desquamated mucosa may produce numerous linear echoes within the lumen that do not originate from the gallbladder wall, and the clinical presentation may resemble acute cholecystitis (Wales, 1982).

MSG may present with abdominal pain or other nonspecific gastrointestinal signs. Pain is thought to result from transient obstruction of bile flow through septal orifices or from uncoordinated gallbladder contractions leading to increased intraluminal compartmental pressure (Hsieh et al., 2021). Although MSG is often asymptomatic, reported clinical signs include intermittent abdominal pain, nausea and less commonly, complications such as cholelithiasis or biliary sludge (Yamamichi et al., 2025). In the veterinary literature, most gallbladder anomalies have been asymptomatic and identified incidentally (Mircean et al., 2008).

However, the presence of small choleliths in such a young dog raises the possibility that septal structures within the gallbladder lumen may influence bile flow dynamics. The compartmentalized morphology created by septa may predispose to bile stasis, thereby facilitating early cholelith formation. A similar progression has been suggested in previously reported canine cases, in which gallbladder septation was associated with subsequent development of cholecystitis or gallbladder abscessation accompanied by cholelithiasis. Although a septated gallbladder may represent an incidental congenital anomaly, its potential role in altering bile flow and predisposing to secondary biliary disease should be considered. Therefore, periodic clinical examination, blood serum biochemistry and ultrasonographic

monitoring may be recommended in affected animals, particularly when cholelithiasis is identified at an early age.

In conclusion, this report describes a septated gallbladder identified in a clinically normal three-month-old dog, supporting the hypothesis that this condition represents a congenital anatomical variation. The concurrent presence of choleliths at such an early age raises the question of whether septal gallbladder morphology may contribute to altered bile dynamics and early biliary stasis. Although the clinical significance of this anomaly remains uncertain, recognition of this rare morphological variation and its potential association with biliary disease may be important for clinicians. Further reports and long-term follow-up of similar cases are required to better elucidate the developmental origin and clinical implications of septated gallbladder anomalies in dogs.

#### Ethical approval

This study is a retrospective case report based on clinical data obtained during routine diagnostic procedures. According to institutional and national guidelines, ethical approval was not required for a single case report. Written informed consent was obtained from the animal's owner for the use of clinical data and imaging findings for publication purposes.

#### Conflict of interest

The authors have disclosed no conflicts of interest regarding the research, authorship, and publication of this case report.

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## References

- Bhagavan, B. S., Amin, P. B., Land, A. S., & Weinberg, T. (1970). Multiseptate gallbladder. Embryogenetic hypotheses. *Archives of pathology*, 89(4), 382-385.
- Causey, M. W., Miller, S., Fernelius, C. A., Burgess, J. R., Brown, T. A., & Newton, C. (2010). Gallbladder duplication: evaluation, treatment, and classification. *Journal of pediatric surgery*, 45(2), 443-446.
- Center, S. A. (2009). Diseases of the gallbladder and biliary tree. *Veterinary Clinics: Small Animal Practice*, 39(3), 543-598.
- Choi, G. C., Ko, J. Y., Ong, S. M., Sur, J. H., & Kang, M. H. (2020). Septate gallbladder in a dog with cholecystitis: A case report and literature review. *Veterinárni medicína*, 65(10), 451.
- Ergin, I., Senel, O. O., Sen, Y., & Bumin, A. (2013). Bilobed gallbladder in a cat. *Revue Méd Vét*, 164(10), 453-6.
- Faraj, C., Essetti, S., Sfar, K., Allali, N., El Haddad, S., & Chat, L. (2024). Multiseptate gallbladder in an asymptomatic child: Case report and review of the literature. *Radiology case reports*, 19(4), 1401-1403. <https://doi.org/10.1016/j.radcr.2023.12.068>
- Hsieh, Y. M., Hsieh, Y. L., Wang, N. L., Wu, P. S., & Weng, S. C. (2021). Multiseptate gallbladder: A case report and literature review. *Medicine*, 100(49), e27992
- Karaca, T., Yoldas, O., Bilgin, B. C., Bilgin, S., Evcik, E., & Ozen, S. (2011). Diagnosis and treatment of multiseptate gallbladder with recurrent abdominal pain. *Case reports in medicine*, 2011(1), 162853.
- Knetsch, A. (1952). Subdivided gallbladders. *Fortschritte auf dem Gebiete der Röntgenstrahlen*, 77(5), 587-589.
- Lange, E., & Beaudu-Lange, C. (2018). Canine multi-septate gall bladders in Bull Terrier puppies: First description and follow up of the most affected one. *Revue veterinaire clinique*, 53(4), 129-133.
- Lee, T. H., Park, S. H., Park, J. Y., Lee, C. K., Chung, I. K., Kim, H. S., & Kim, S. J. (2009). Gallbladder pseudodiverticulosis mimicking a multiseptate gallbladder with stones. *Gut and Liver*, 3(2), 134.
- Mahato, N. K. (2010). Septate gallbladder: gross and histological perspectives in an uncommon occurrence. *Int J Anat Var*, 3(1), 70-2.
- Mircean, M., Giurgiu, G., Scurtu, I., Popovici, C., & Kiss, T. (2008). Observations regarding the comparative value of ultrasonography and laboratory diagnosis of hepatobiliary diseases in dogs. *Bulletin UASVM Veterinary Medicine*, 65(2), 20-5.
- Simon, M., & Tandon, B. N. (1963). Multiseptate gallbladder: a case report. *Radiology*, 80(1), 84-86.
- Terkawi, R. S., Qutob, D., & Hendaus, M. A. (2021). Understanding multiseptated gallbladder: a systematic analysis with a case report. *JGH Open*, 5(9), 988-996.
- Wales, L. R. (1982). Desquamated gallbladder mucosa: unusual sign of cholecystitis. *AJR. American journal of roentgenology*, 139(4), 810-811.
- Yamamichi, T., Tsukada, R., Iwasaki, S., Omote, R., & Saka, R. (2025). Multiseptate gallbladder with gallstones in a pediatric patient. *Radiology Case Reports*, 20(12), 5989-5993.