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# Atlas of Small Parts Ultrasound with Color Flow Imaging

4th Edition









**PK Srivastava**

*Foreword*
**Ravi Kant**

JAYPEE

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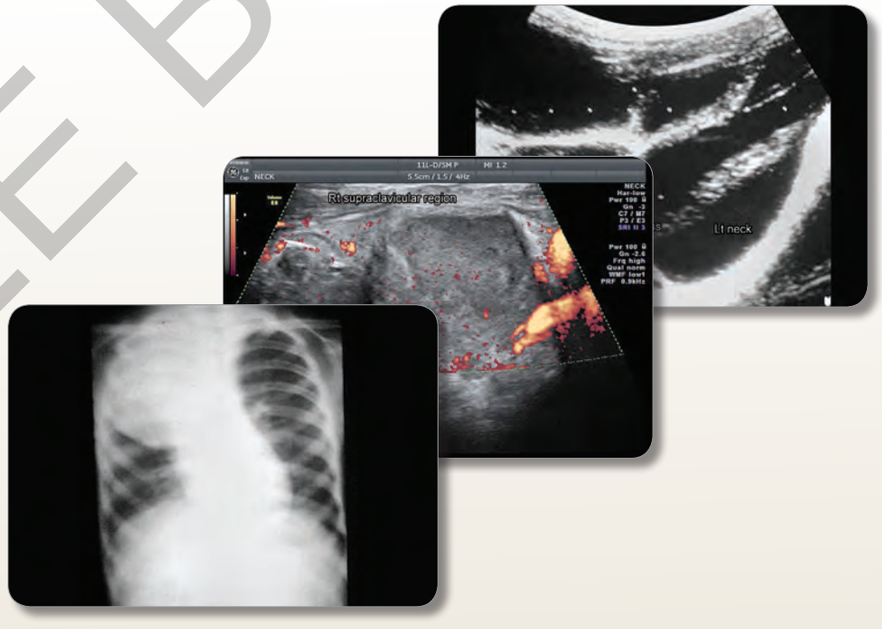

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# CHAPTER 4

# Neck

*PK Srivastava*




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## INTRODUCTION

High-resolution sonography (HRSG) is an excellent modality to examine the neck and neck masses. The excellent tissue details and anatomical landmarks in neck like thyroid cartilage; trachea, strap muscles and neck vessels have made assessment of neck masses a practical proposition. The neck masses have been divided into the following heads for convenience besides thyroid and parathyroid glands:

1. Cervical masses
2. Lymph node mass
3. Salivary glands

## CERVICAL MASSES

Besides thyroid and parathyroid gland pathologies, other cervical masses are mainly present below hyoid bone in midcervical or lower cervical regions. They are mainly confined to anterior triangle of the neck; however, few masses are also seen in the posterior triangle of the neck like nerve tumors and abscess. The cervical masses are grouped as follows:

1. Congenital masses
2. Inflammatory masses
3. Vascular masses
4. Benign tumors
5. Malignant Tumors.

## CONGENITAL MASSES

Congenital masses are found in children usually as developmental anomalies. They are grouped as: (i) thyroglossal duct cysts, (ii) branchial cysts, and (iii) cystic hygromas.

### Thyroglossal Duct Cysts

These are formed due to remnant of the duct, which is filled due to secretion of epithelial cell rests. In normal embryological development, the thyroid gland descends down along thyroglossal duct to its normal position. The duct undergoes progressive atrophy. However, when it remains patent it is filled with clear fluid filled cystic mass in the midline anterior to the thyroid gland. Small cyst is difficult to differentiate from the reactive lymph node enlargement, which undergoes cystic necrosis. However, high frequency transducers of 13 to 15 MHz can differentiate them. Hemorrhage is common in the cyst. It can be seen as highly reflective mobile shadow in the dependent part of the cyst.

### Branchial Cysts

These cysts arise from the branchial cleft usually from the second cleft. It is lateral in position. It is situated in the anterior triangle of neck along the anterior margins of sternocleidomastoid muscle. It is situated between suprahyoid and carotid spaces. These cysts are present in the childhood. The cyst is seen as a well-defined thin walled echo free mass on HRSG. It is round with sharp clear margins. It is clearly separated and demarcated with sternocleidomastoid muscle border. Secondary infection may take place in the cyst and low level echoes are noted on HRSG.

### Cystic Hygromas

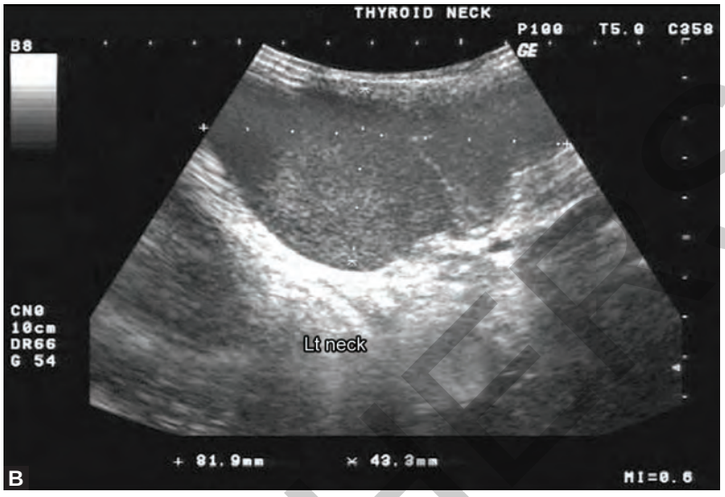
These are serous benign cystic masses arising from the lymphoid tissue. They are noncapsulated and usually confined to posterior triangle of the neck. When they are big they are seen reaching up to anterior part of neck or upper part of the superior mediastinum. They may also be seen reaching up to axilla. On HRSG, it appears to be multilocular cystic mass with echogenic fibrous septa with thin regular, smooth margins. The internal structures are usually free and anechoic. However, low amplitude echoes may be seen in the loculae representing fine jelly like consistency of cystic hygroma. Secondary hemorrhage is also encountered in cystic hygroma.

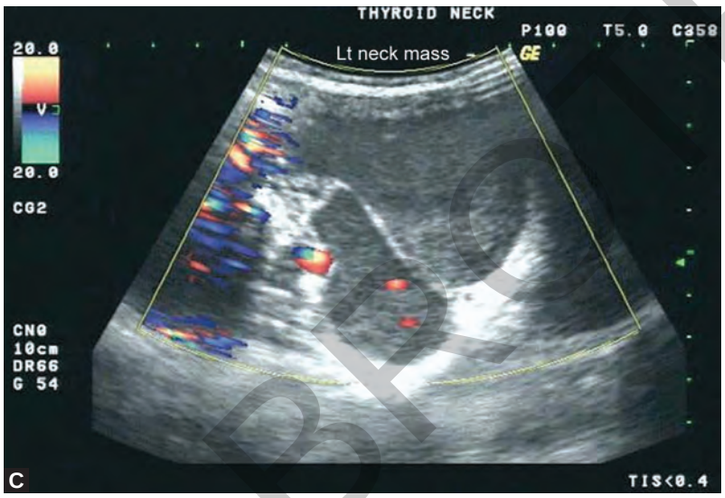
### Sublingual Dermoid

It is a benign congenital condition. It is seen a medium to hard consistency mass with sharp margins on clinical examination. It presses over the floor of the mouth and pressure is seen on the tongue. On HRSG, a highly heterogeneous irregular mass with poor margins with variable texture is seen. Areas of low-level echoes are seen in it, suggestive of cystic degeneration. Echogenic shadows are also seen which represent fibrous element of the cyst. At times, echogenic foci are also seen suggestive of calcification. They are accompanied with acoustic shadowing.

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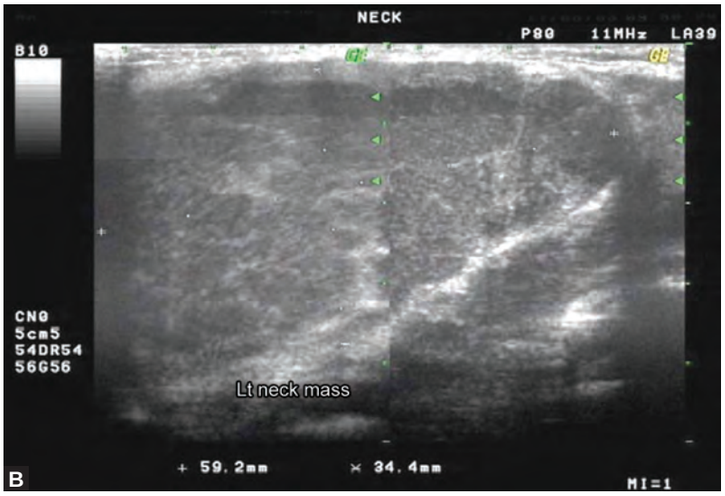



**FIGURES 4.1A to C: Cystic hygroma.** A young child presented with a soft tissue swelling in the neck. HRSG shows a multiloculated well-defined cystic mass in the left side of the neck. Echogenic septa are also seen in the mass. Low-level echo collection is seen in the cyst suggestive of serous collection. The margins are smooth, typical findings of a cystic hygroma.




**FIGURES 4.2A and B**

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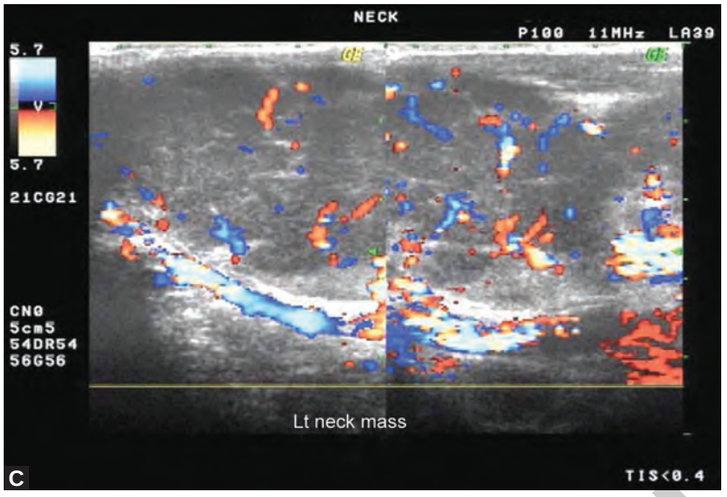
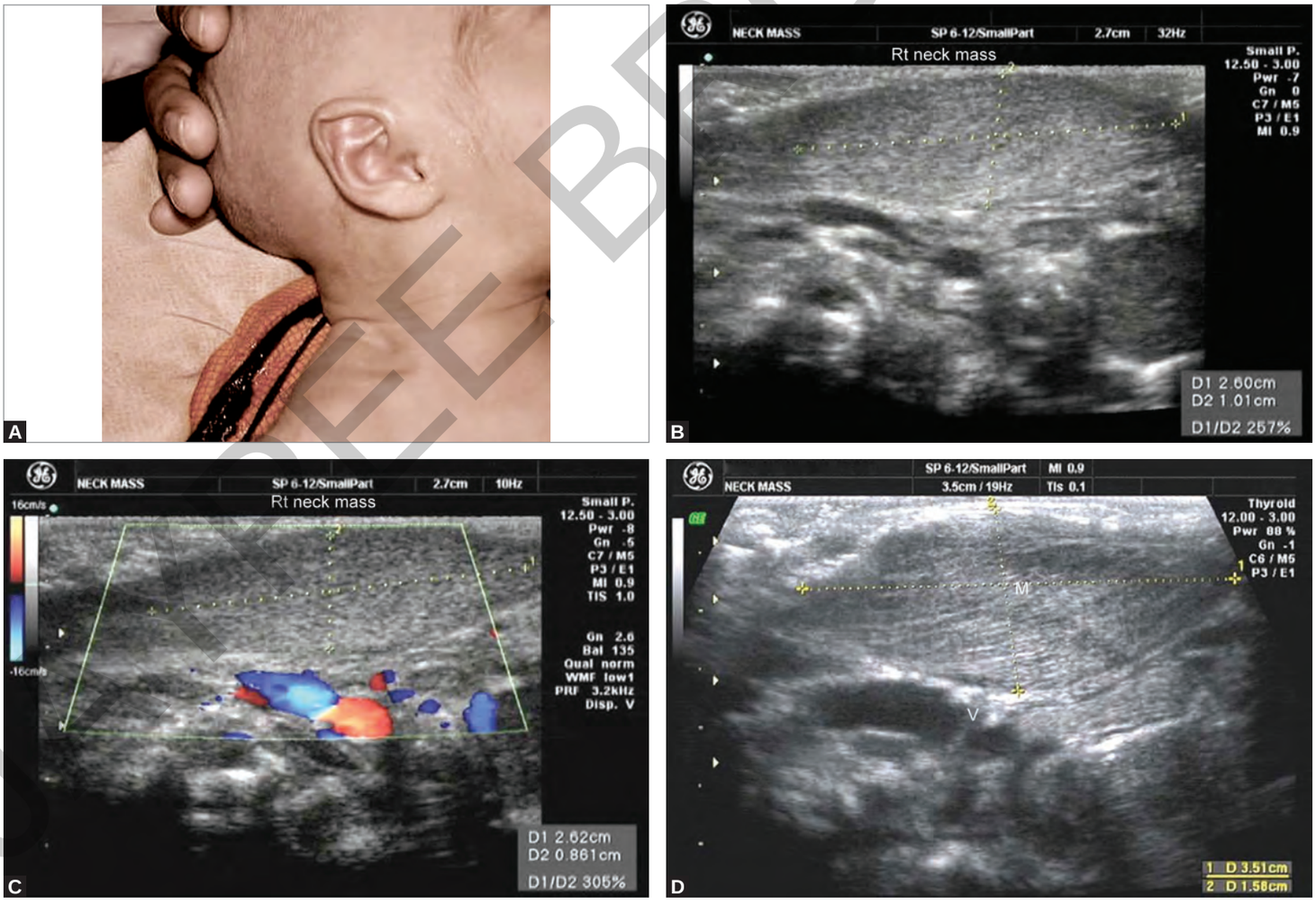


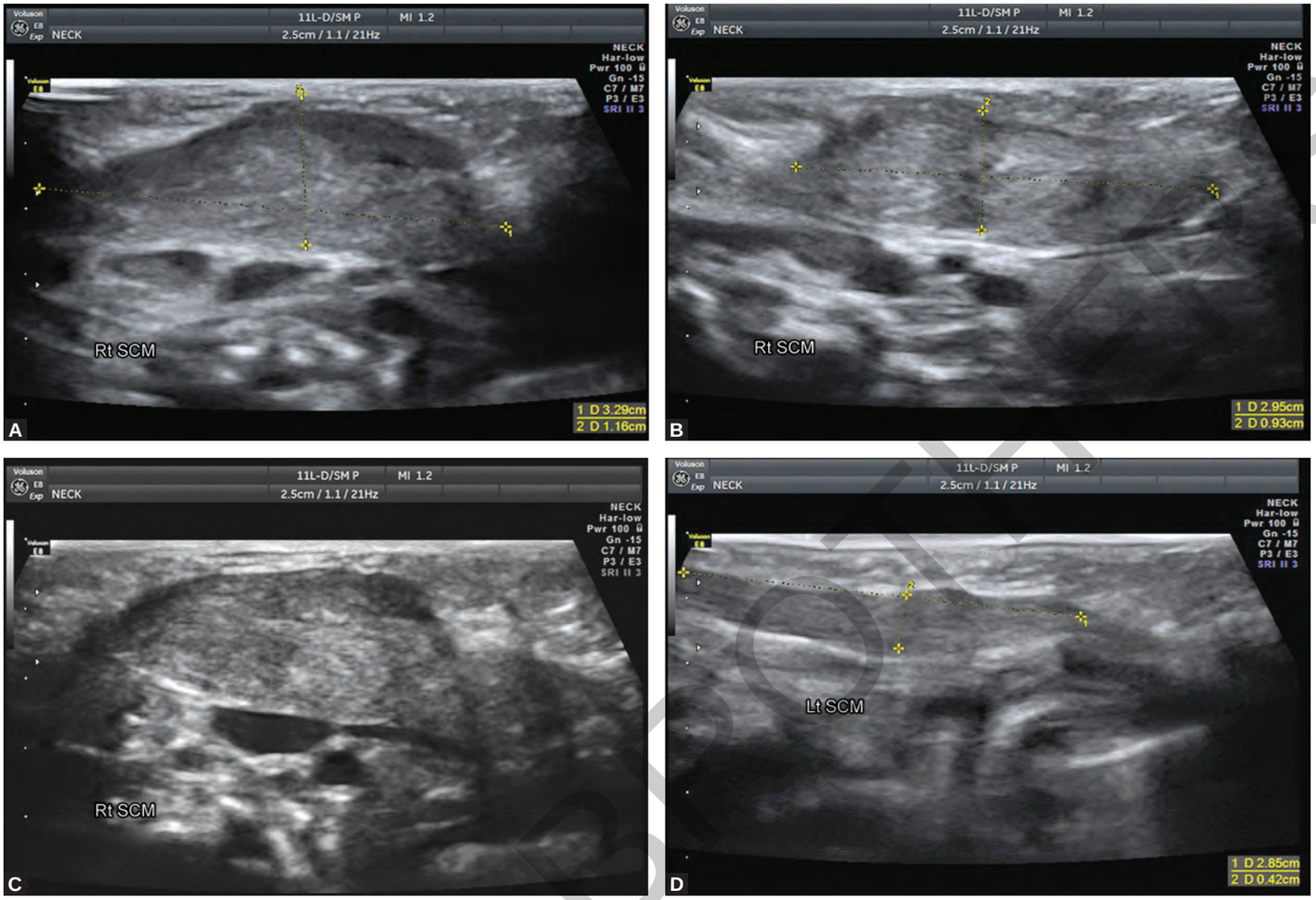

**FIGURE 4.2C**

**FIGURES 4.2A to C: Lymphangioma neck.** A young child presented with cystic mass in the left upper cervical region. HRSG shows a well-defined low-level echo complex mass in the left neck the mass shows low-level thick echoes. Thin echogenic septa are also seen in the mass. On color flow imaging, multiple vessels are seen feeding the mass. Fine needle aspiration cytology (FNAC) confirmed lymphangioma.

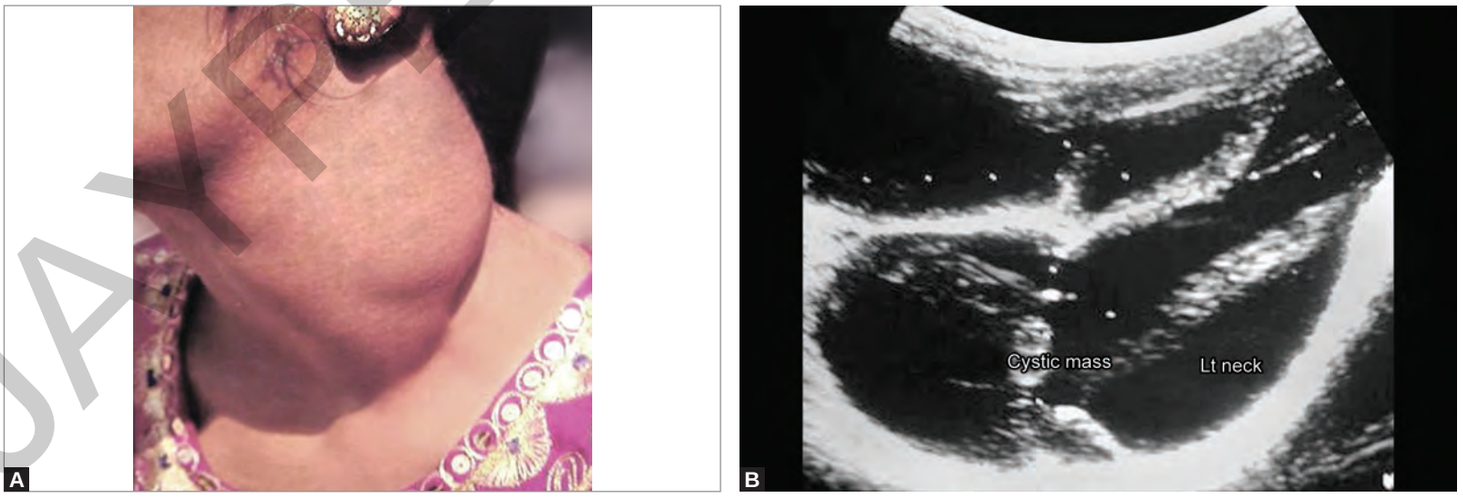



**FIGURES 4.3A to D: Sternocleidomastoid tumor (SCM tumor).** A young child was born with soft tissue swelling in the right side of the neck. HRSG shows a well-defined fusiform mass in the sternocleidomastoid muscle. It is homogeneous in texture. No calcification or necrosis is seen in it. On color flow imaging, no flow is seen in it.

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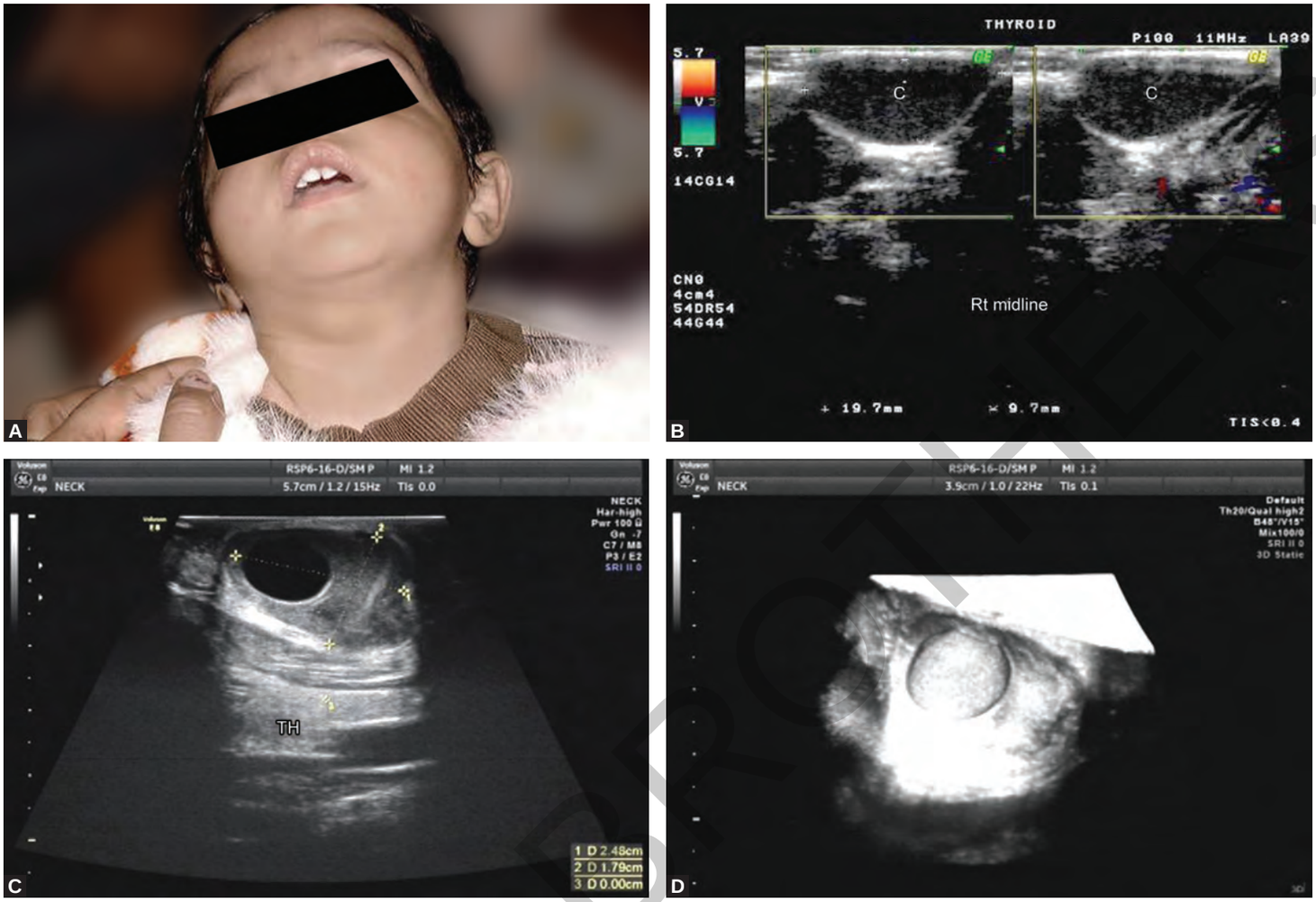



**FIGURES 4.4A to D: Sternocleidomastoid (SCM) tumor.** An infant girl was born with soft tissue mass in the neck. HRSG shows a well-defined mass in the sternocleidomastoid muscle. Fine muscle striations are also seen in the mass suggestive of SCM tumor. On color flow imaging, no flow is seen in it. Sternocleidomastoid tumor is also known as fibromatosis colli. The left SCM muscle shows normal texture with smooth outline.

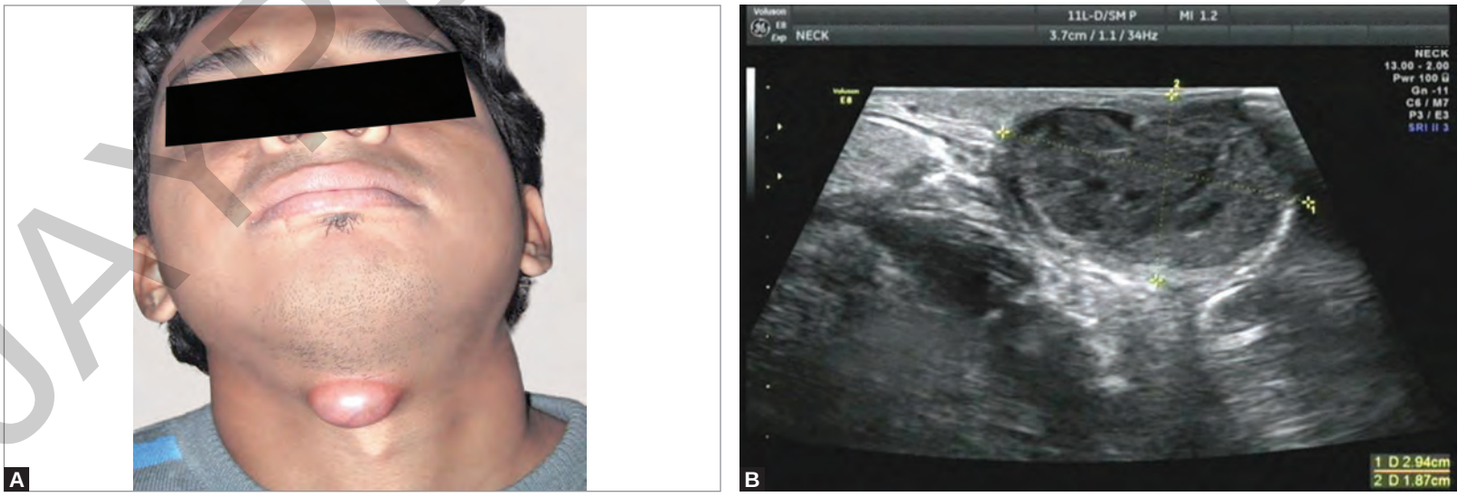



**FIGURES 4.5A and B: Infected cystic hygroma.** A young lady presented with a soft tissue mass swelling in the left side of the neck present since the birth. There was the history of intervention done in the cystic mass and serous fluid was aspirated. HRSG shows a big multiloculated cystic mass in the same patient. Multiple internal echoes are seen in the cyst. Few calcified specks are also seen. The cyst is seen low level echogenic collection at the base suggestive of debris. Biopsy of the cyst shows cystic hygroma.

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**FIGURES 4.6A to D: Thyroglossal cyst.** A child was presented with midline cystic mass. HRSG shows normal thyroid gland in the thyroid fossa on either side of the trachea. The cyst was not seen in relation to the thyroid. Three-dimensional (3D) volume contrast imaging shows the cyst very clearly.



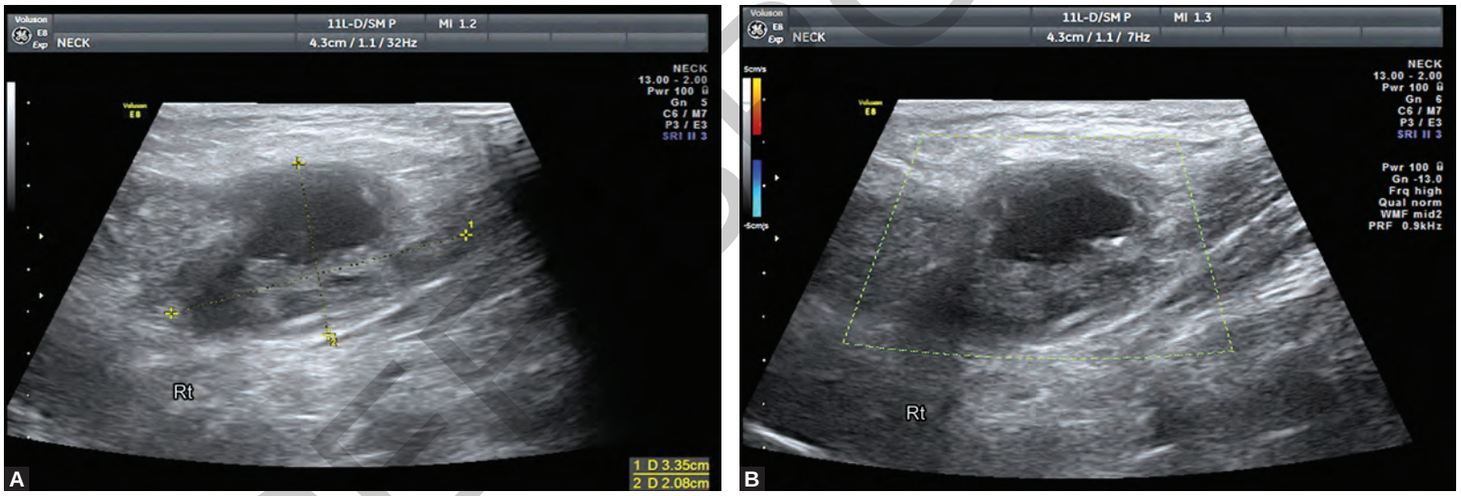

**FIGURES 4.7A to B**

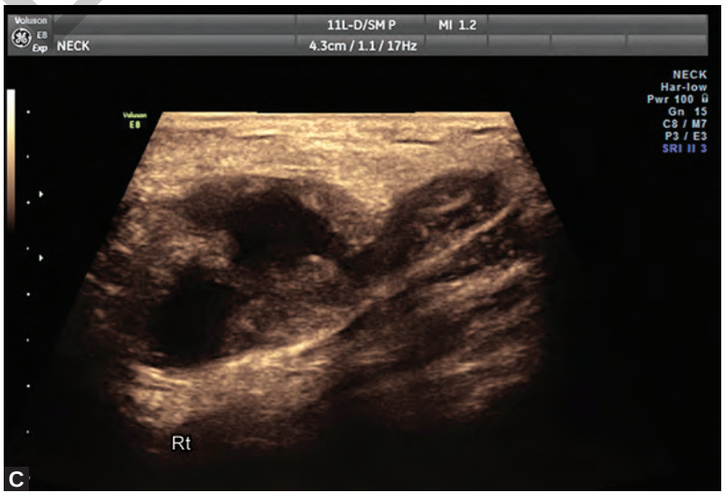
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**FIGURE 4.7C**

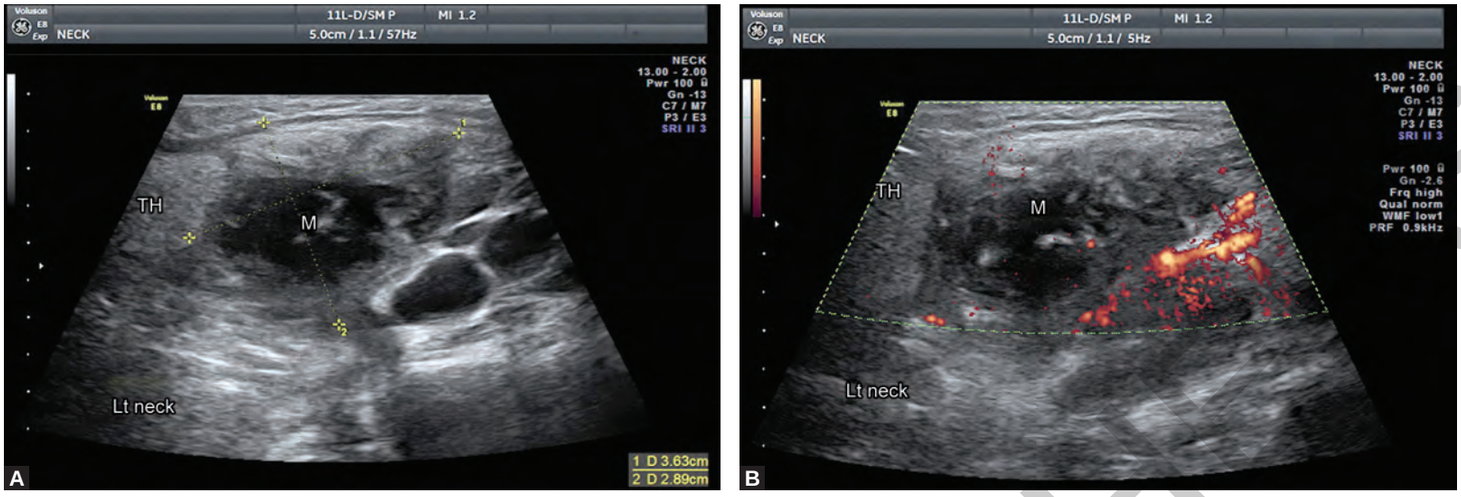
**FIGURES 4.7A to C: Infected thyroglossal duct cyst.** A young man presented with midline soft tissue swelling in the neck, which was tensed and hot. HRSG shows a thick-walled well-defined cystic mass anterior to the thyroid gland in the midline of neck. Multiple internal echoes are seen in it suggestive of secondary infection. Fine needle aspiration confirms infected thyroglossal cyst.



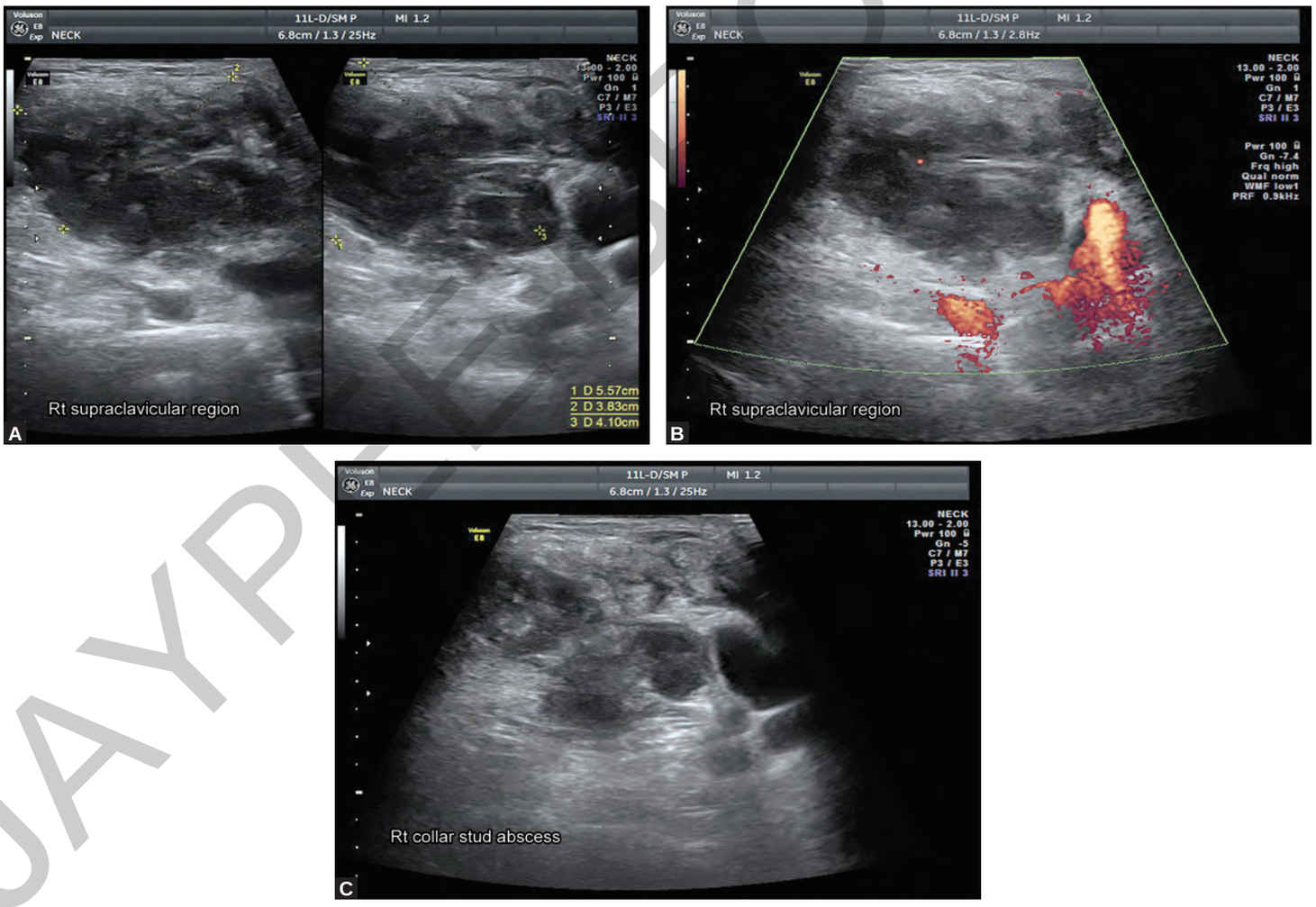




**FIGURES 4.8A to C: Neck abscess.** A lady presented with soft tissue mass in the right side of neck. It was tense and hot. Multiple internal echoes are seen in it. It is seen supraclavicular region. Central area of necrosis is seen in it. On color flow imaging, it shows poor flow. Findings are suggestive of pyogenic abscess in the neck.

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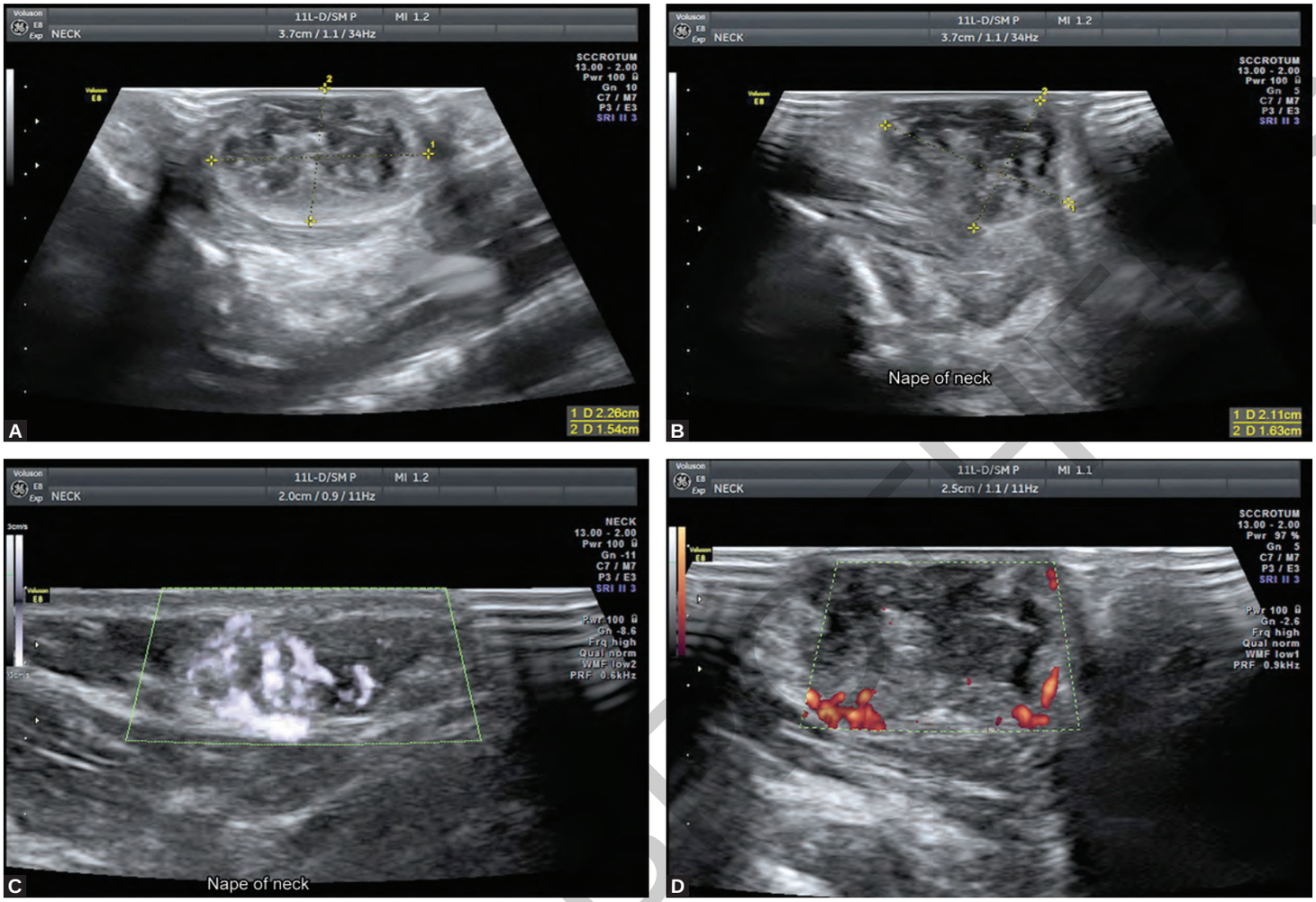



**FIGURES 4.9A and B: Neck abscess.** HRSG shows a big irregular ill defined low level echo complex mass in the left side of the neck in the mid cervical region. Margins are irregular. Central area of necrosis is seen into it. But no cystic degeneration is seen. It is separate from the left lobe of thyroid. On color flow imaging, no flow is seen in it. Few enlarged nodal shadows are also seen in the left side of neck.

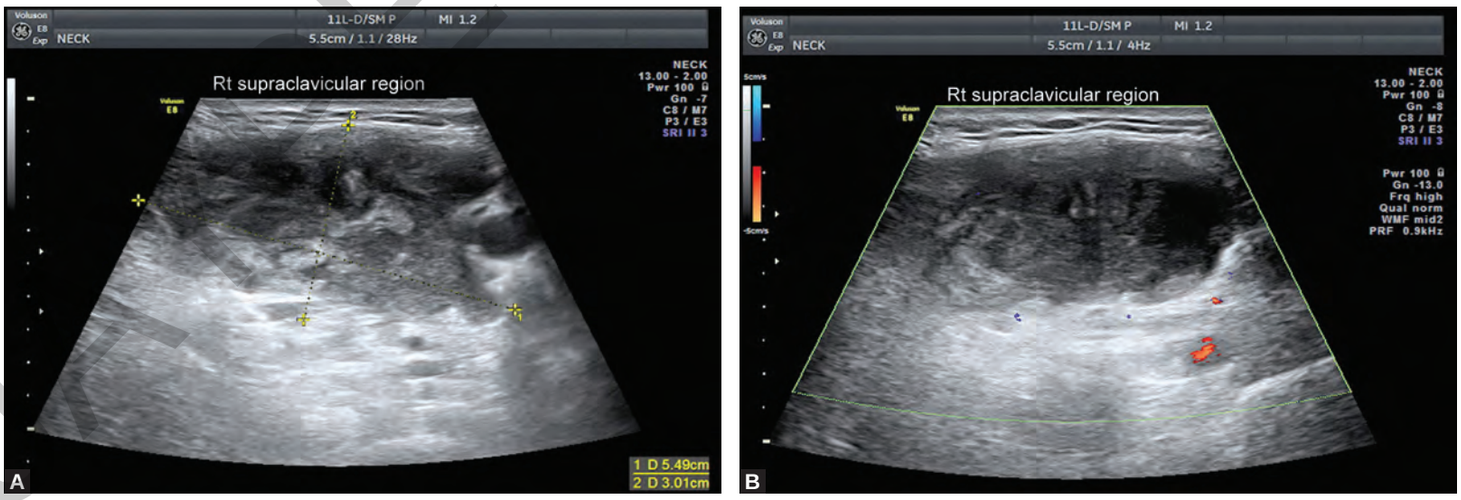



**FIGURES 4.10A to C: Collar stud abscess with cellulitis.** A patient presented with painful soft tissue mass in the right supraclavicular region. HRSG shows a big irregular ill defined low level echo complex mass in the right supraclavicular region. The mass shows hypoechoic texture. Thick cheesy collection is seen into it suggestive of an abscess. Marked perifocal edema is also present. Subcutaneous soft tissue edema is present in the mass. But no cystic degeneration is seen. On color flow imaging, no flow is seen in it. Enlarged nodal shadows are also seen in the neck suggestive of reactive nodal enlargement. Neck vessels are normal in appearance. However, pressure is seen in the neck vessels.

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**FIGURES 4.11A to D: Abscess at the nape with cellulitis.** A newborn 15 days old baby presented with soft tissue swelling over the nape of neck. HRSG shows a thick walled mixed echo complex mass over the nape of the neck. Thick echoes are seen into it. But no cystic degeneration is seen. However, area of necrosis is seen in the mass. On color flow imaging, increased flow is seen around it. Associated soft tissue subcutaneous edema is also seen. The mass is not seen communicating with spinal cord. No intracranial extension of the mass is seen. Few enlarged nodal shadows are also seen in the posterior triangle.




**FIGURES 4.12A and B**

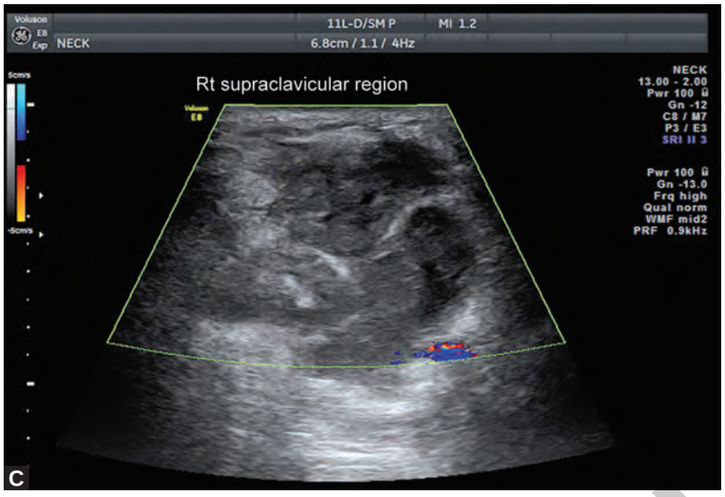
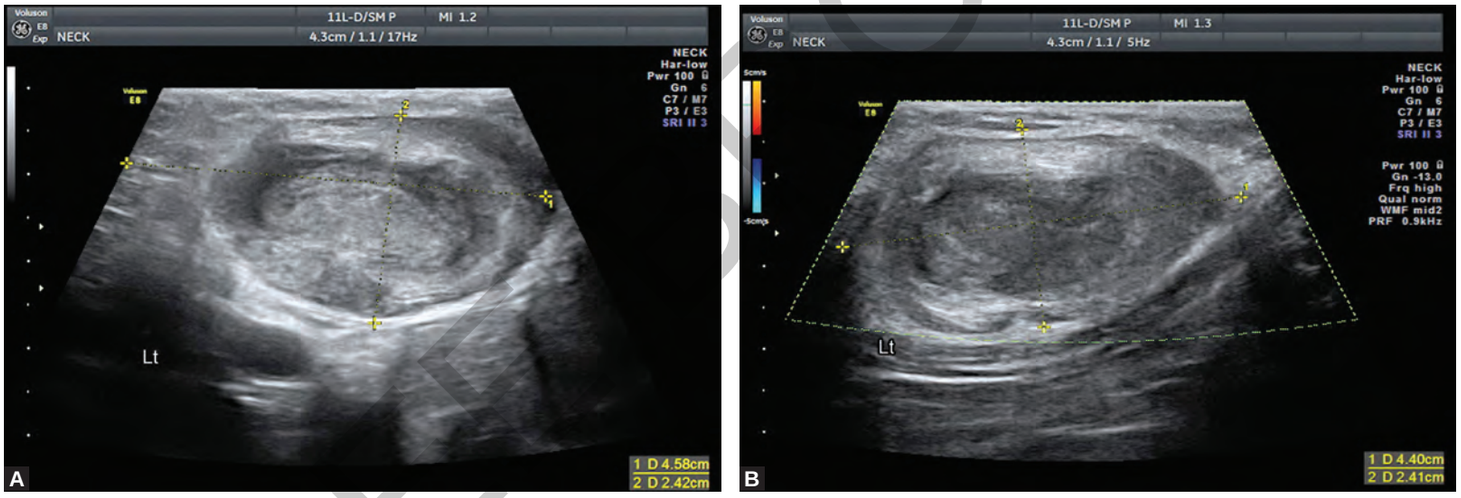
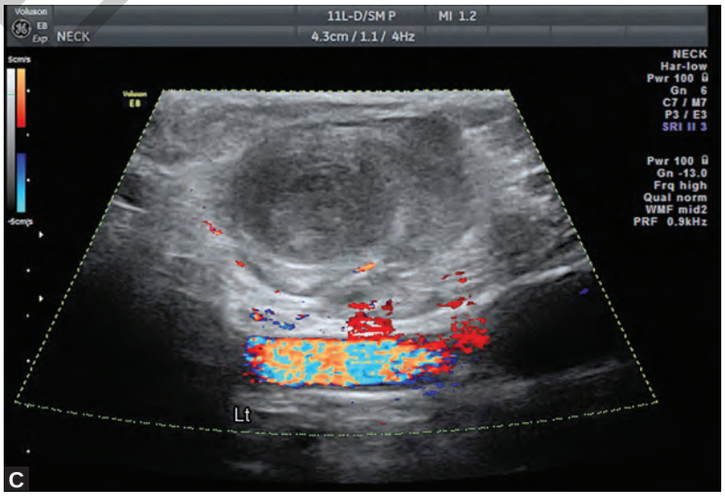



**FIGURE 4.12C**

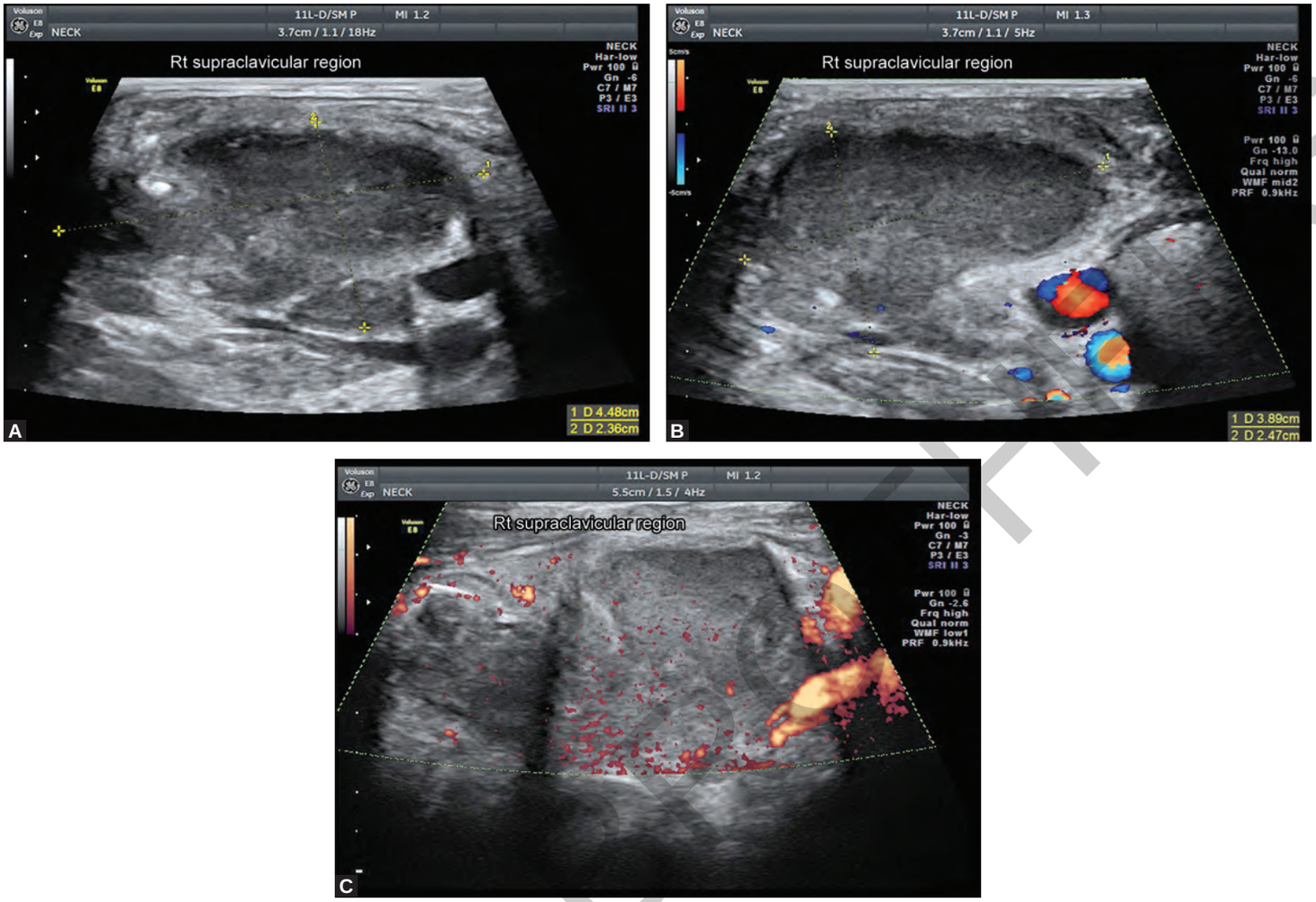
**FIGURES 4.12A to C: Collar stud abscess.** HRSG shows a big irregular ill-defined inhomogeneous hypoechoic low level echo complex mass seen in the right supraclavicular region. It is seen extending to the posterior side. Walls are ill defined. Central area of necrosis is seen into it. Thick echoes are seen in it. On color flow imaging, no flow is seen into it. It is not seen pressing over the neck vessels. Enlarged nodal shadows are also seen in the right upper cervical region.



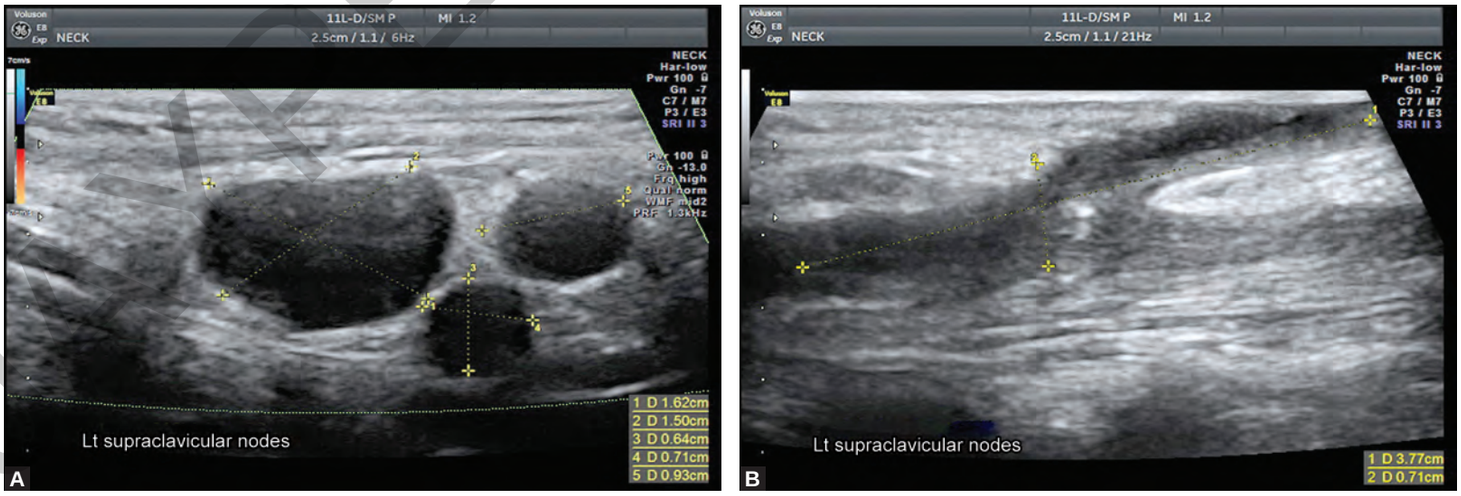




**FIGURES 4.13A to C: Acute hemorrhage in the cyst.** A patient presented with a painful soft tissue swelling with acute onset in the left side of neck. Clinically, it was thought to be thyroid mass. However, HRSG shows a thick-walled cystic mass in the left side of neck. It is seen in the superficial plane. Thick echoes are seen into it. But no calcification is seen. But no cystic degeneration is seen. On color flow imaging, no flow is seen into it. No pressure is seen on neck vessels.

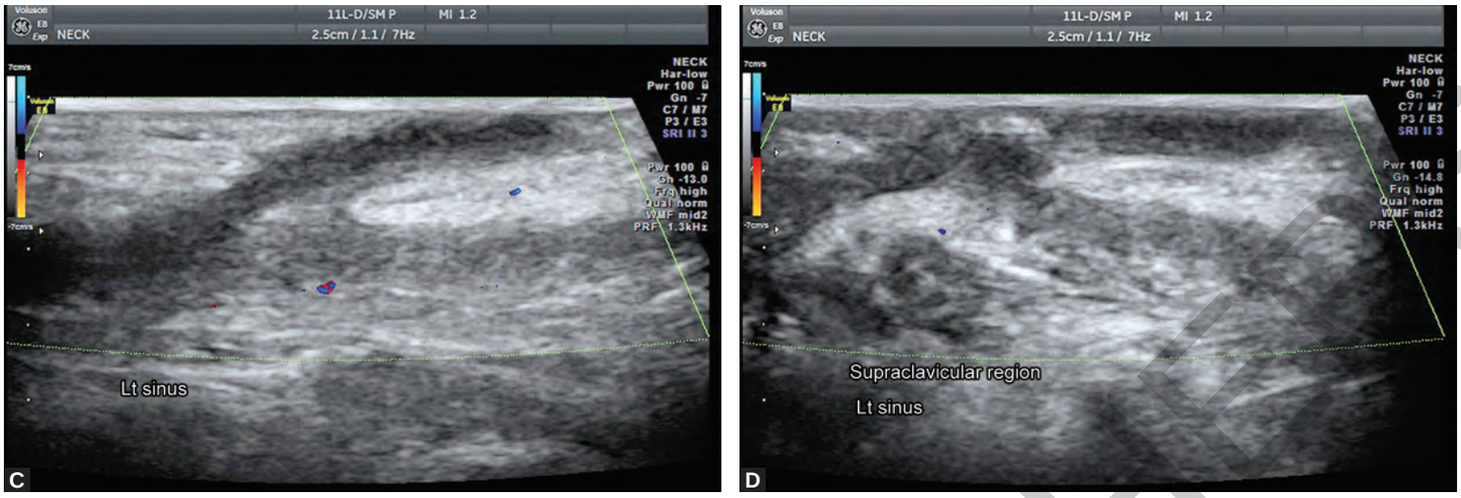
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**FIGURES 4.14A to C: Collar stud abscess.** HRSG shows a thick-walled pocket of low level echo collection in the right supraclavicular region. Thick echoes are seen into it. It is seen extending below the clavicle collar stud abscess. Multiple enlarged nodes are also seen in right upper cervical and midcervical regions.

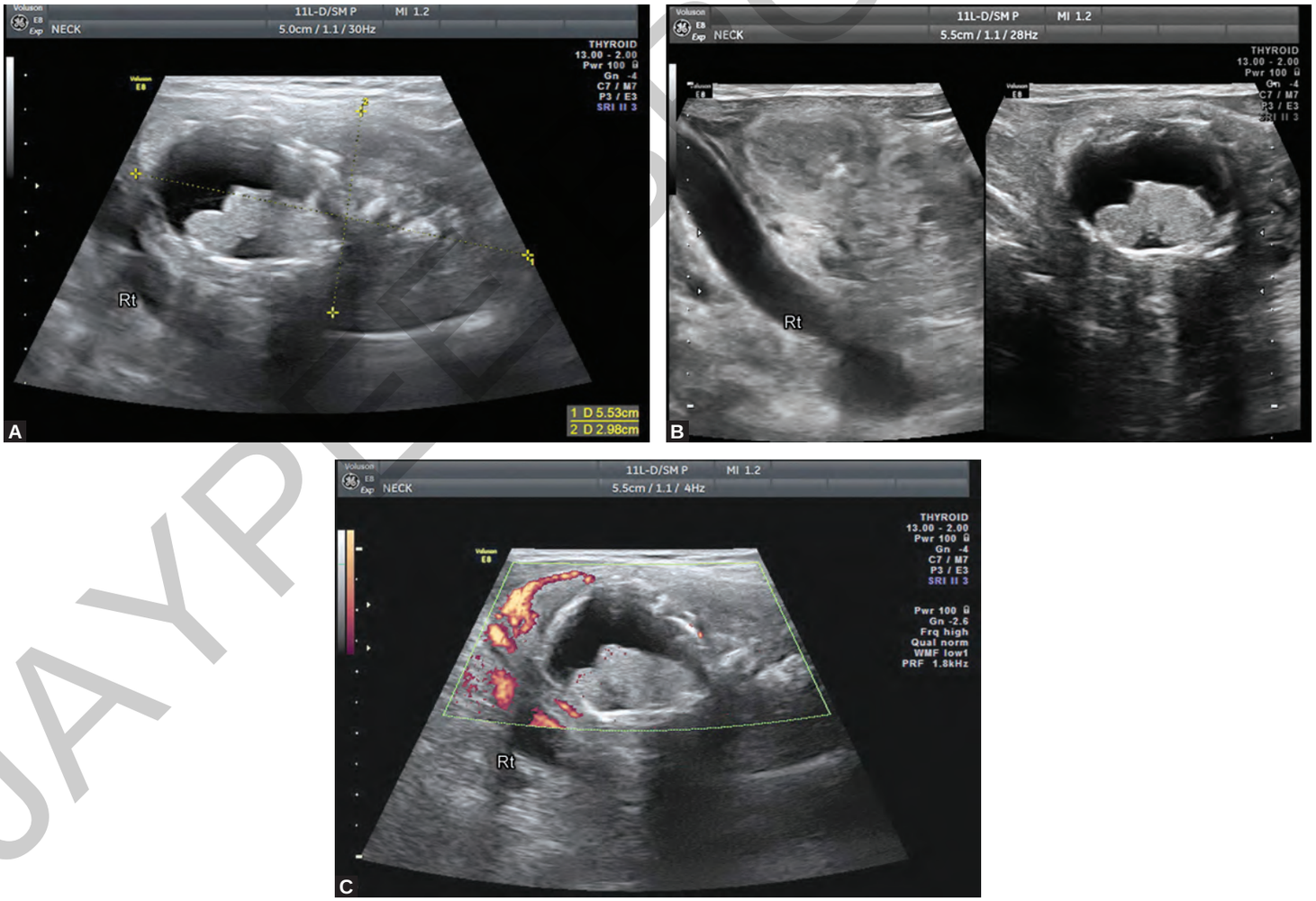



**FIGURES 4.15A and B**




**FIGURES 4.15C and D**

**FIGURES 4.15A to D: Tubercular abscess with sinus formation.** HRSG shows multiple hypoechoic nodal masses in the left supraclavicular region. Central area of necrosis is seen in them. An obliquely running sinus tract is also seen in the left midcervical region. It is 40 mm in length and 5 mm in width. It is 2 cm deep from the skin. Small pocket of collection is seen in the neck communicating with the sinus tract. Associated soft tissue edema is also seen in the neck.




**FIGURES 4.16A to C:** A patient presented with soft tissue mass in the right side of neck. HRSG shows a heterogeneous mass in right lobe of thyroid. The mass is predominantly cystic. Echogenic soft tissue shadows are also seen. On color flow imaging, poor flow is seen. FNAC of the mass confirms cystic adenoma.

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# Atlas of
# Small Parts Ultrasound
## with Color Flow Imaging

High-resolution ultrasound has established as an excellent imaging modality for evaluation of small parts. With the innovation of 3D ultrasound and tomographic ultrasound imaging, it provides excellent tissue details in multi-sectional and cross-sectional anatomy as seen in CT and MRI. The spatial resolution of ultrasound is better than CT and MRI. The tissue characterization of small parts of infant brain, eye and orbit, neck, thyroid, salivary glands, face is much better than costly imaging modalities like CT and MRI. It is also choice of investigation for evaluation of peripheral chest, breast and GIT. Transrectal ultrasound with cross-sectional imaging of prostate gives excellent anatomical details of prostate and with TUI imaging small lesions with 2 mm size can be easily picked up. High-resolution ultrasound is first line of investigation for evaluation of sperm transport system and in difficult clinical situations like ambiguous genitalia and intersex. It is also recommended modality for evaluation of anterior abdominal wall pathologies. This is the first Atlas of Small Parts Ultrasound with Color Flow Imaging having more than 4,500 images in the world literature.



**PK Srivastava** MBBS MD (Radiology) FICR FICMU is Professor, Department of Radiodiagnosis, King George's Medical University, Lucknow, and Director, Yashdeep Ultrasound Centers, Lucknow (UP), India. His main area of interest is high-resolution ultrasound of small parts and musculoskeletal ultrasound. He is having experience of more than 30 years in the field of ultrasound imaging. He has delivered many guest lectures in international and national conferences on ultrasound. He has written the book Atlas of Musculoskeletal Ultrasound published in 2014. He is Founder Fellow of Indian College of Medical Ultrasound and also Visiting Fellow of Ultrasound to University of California, Los Angeles (UCLA) and San Francisco (UCSF), USA. He is Ex-President, Indian Federation of Ultrasound in Medicine and Biology (IFUMB) 2005-2006, Indian Radiology and Imaging Association (IRIA), UP State Branch 2007-2008, Chairman, Ultrasound Education and Research Foundation.

He has received Award of Excellence, King George's Medical University, Lucknow 2014 . He has also received following oration awards: Dr Arcot Gajraj Endowment Oration of Indian Society of Pediatric Radiology in 2013, Sir JC Bose Oration Award of Indian Radiology and Imaging Association (IRIA) for the year 2011, Dr Ramrishi Oration Award of MP State, IRIA Branch for the year 2009, Dr KT Dholakia Oration Award of Western India Regional Orthopedics Conference (WIROC) 2008, Dr SK Sharma Oration Award of Indian Federation of Ultrasound in Medicine and Biology (IFUMB) for the year 2004, Dr Panna Lal Varshney Oration Award of UP Chapter of IRIA for the year 2001, Dr Mihir Mittal Oration Award of Indian College of Radiology for the year 2000.

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