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Anatomical classification and operative strategy for bilateral congenital lung lesions in children: a consecutive series of eight patients with a review of the literature

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Abstract

Purpose

Bilateral congenital lung lesions are rare and no operative framework exists. We describe the anatomical patterns and how they determine operative decisions.

Methods

Of 660 consecutive resections for congenital lung lesions (September 2019 to July 2026), eight children (1.2%) had lesions in both hemithoraces on contrast-enhanced computed tomography (CT). Lesions were continuous when a structure linked the two sides anterior to the spine, and separate when independent.

Results

Two patients had continuous lesions, one linked by an arterial trunk from the abdominal aorta and one by an extralobar sequestration crossing the midline; both were resected through one pleural cavity. Of the six with separate lesions, four met an indication on both sides and were operated in two stages 6.7 to 16.4 months apart; in two the contralateral lesion (4.5 and 13 mm) was observed. All 12 operations were completed thoracoscopically without conversion, transfusion or complication, and no new contralateral lesion appeared over a median follow-up of 32 months.

Conclusion

The first question is whether a structure links the two sides anterior to the spine. If so, both sides can be resected through one pleural cavity; if not, each side is judged on its own indication and staged resection preferred.

Introduction

Congenital lung lesions are a group of embryonic anomalies of lung development, of which congenital pulmonary airway malformation (CPAM) and bronchopulmonary sequestration (BPS) are the most common. BPS is further divided, according to whether it has its own visceral pleura, into intralobar (ILS) and extralobar (ELS) sequestration [1]. Widespread prenatal ultrasonography and fetal magnetic resonance imaging now detect most lesions in utero [2–4], and large prenatally diagnosed cohorts have been reported from China [5, 6]. Most lesions are unilateral and confined, and postnatal thoracoscopic resection has become the standard approach [7–9].

Bilateral disease is reported only sporadically, mostly as single cases, and management differs widely between reports. In a Chinese series of 2625 adults with BPS, only three had bilateral disease [10]. Resection of both sides through a single pleural cavity has been described: in the patient reported by McLean et al. [11], a right lower lobe CPAM and a left lower lobe ELS were joined by a transmidline band of tissue containing abnormal airway, artery and vein, and both were removed through one right thoracotomy. Simultaneous resection through a bilateral approach has also been described: in the patient reported by Suzuki et al. [12], the two lesions drained through a common trunk into the right inferior pulmonary vein, and because resecting one side alone would have left the other congested, the authors used a bilateral thoracoscopic approach. Staged resection was reported by Trudel et al. [13], whose 15-year-old patient had a left ELS and a right ILS with mirror-image anomalous vessels and underwent two separate thoracotomies. No two of these reports managed the problem in the same way.

Three questions must be answered before operation: whether both sides require treatment; if they do, whether to complete treatment in one session or in two; and whether to use a unilateral or a bilateral approach. No accepted framework addresses them. We therefore reviewed the records and operative details of children with bilateral congenital lung lesions treated at our

centre between September 2019 and July 2026, and combined this with a systematic search of the literature, in order to define the anatomical patterns of the condition and the operative strategy that follows from them.

Methods

Study population

Between September 2019 and July 2026, 660 children underwent resection of a congenital lung lesion in the Department of Thoracic and Oncologic Surgery, Capital Center for Children's Health, Capital Medical University. Children were eligible if contrast-enhanced computed tomography (CT) at first presentation showed typical CPAM or BPS lesions in both hemithoraces; eight met this criterion on review. The study was approved by the institutional ethics committee (approval no. SHERLLM2024028).

Classification and operative strategy

Chest CT was performed in the arterial and venous phases, with coronal and sagittal reconstruction and three-dimensional vascular reconstruction. Lesions were classified as continuous or separate according to whether a continuous structure links the two sides anterior to the spine. The presence and the type of continuity were determined independently by one radiologist and one paediatric surgeon, both blinded to the operative findings; disagreements were to be resolved by joint review, and none occurred in these eight patients.

Continuous type. A continuous structure is one that links the two lesions across the midline anterior to the spine, and takes one of three forms: (i) the lesion itself crosses the midline, or lesional tissue bridges the two sides; (ii) both sides are supplied by a single arterial trunk or drain through a single venous trunk; or (iii) an abnormal fistula communicates between them. When any of these applies, the two sides have no anatomical boundary at which they can be divided, and the extent of resection is set by the course of the structure rather than by the indication on either side.

Separate type. The two lesions are independent and unconnected. Each side is then assessed on its own: when both sides meet an indication, staged bilateral resection is preferred, at the cost of two anaesthetics and two hospital admissions; when only one side does, only that side is treated and the contralateral lesion is followed up (Fig. 1).

Indications for operation

The indications for operation were: (i) respiratory symptoms — pneumonia in the same lobe twice or more within 12 months, a single episode of pneumonia without radiological resolution after 4 weeks of appropriate antibiotics, or a history of lung abscess, spontaneous pneumothorax or haemoptysis; (ii) progression or inability to exclude malignancy — an increase of at least 20% in the maximum diameter during follow-up, or the appearance of mural nodules, increasing solid components or other features suggesting pleuropulmonary blastoma (PPB); (iii) compressive effects — mediastinal shift, atelectasis of adjacent lung or restricted ventilation; and (iv) absence of symptoms with a maximum diameter greater than 20 mm [14].

Data collection

Sex, age at first operation, prenatal ultrasound findings, contrast-enhanced CT findings, operative procedure, operative time, transfusion, conversion to thoracotomy, complications graded by the Clavien–Dindo classification, postoperative hospital stay, duration of chest drainage, interval between operations, pathological findings and follow-up were recorded.

Literature review

PubMed, Web of Science Data were searched from inception to September 2026. The search string was: ("bilateral" OR "contralateral" OR "both lungs" OR "horseshoe" OR "bridging isthmus") AND ("congenital pulmonary airway malformation" OR "congenital cystic adenomatoid malformation" OR "bronchopulmonary sequestration" OR "pulmonary sequestration" OR "congenital lung malformation" OR "congenital lung lesion"). Duplicates were removed and the remaining records were screened by title and abstract, with the remainder assessed in full text or by abstract.

Reports were eligible if they were original case reports describing lesions in both hemithoraces (including across the midline), stating the treatment given, in patients younger than 18 years. Reports confined to imaging or diagnostic technique, those concerned with prenatal diagnosis or neonatal death, those with a lesion on one side only, those of adult patients, and those that did not report the pathological diagnosis of each side were excluded. Two investigators screened independently, and disagreements were resolved by reviewing the full text.

Statistical analysis

Analysis was descriptive. Continuous variables are given as median (range) and categorical variables as number (%). The sample was too small for comparison between groups.

Results

Cohort and baseline data

The eight patients accounted for 1.21% (8/660) of the children with congenital lung lesions treated during the same period. There were six boys and two girls, and the age at first operation ranged from 4.8 to 94.8 months (median 7.7). All but patient 5, who presented at 7 years of age with pneumonia, were detected by prenatal ultrasound. Two patients had continuous and six separate lesions; of the latter, both sides met an indication in four and only one side in two. Patients were numbered by type and, within each group, by date of first operation. Individual data are given in Table 1 and preoperative CT in Fig. 2.

Operative findings in the continuous type

Both patients of this type were operated on through a single pleural cavity.

Patient 1 (ILS). Contrast-enhanced CT showed a cystic lucency with patchy consolidation in the posterior basal segment of the left lower lobe, measuring 41.5 × 42.1 × 43.7 mm, and multiple cystic lucencies in the paravertebral basal segment of the right lower lobe, measuring 15.2 × 23.1 × 20.0 mm. An aberrant artery arising from the abdominal aorta ran anterior to the spine and branched to both lower lobes, with a trunk diameter of 5.4 mm; each side drained through its own pulmonary veins. Through a left thoracoscopic approach the artery was dissected and occluded first, the right-sided lesion was resected by following its branches across the midline, and the main lesion was then resected on the left. Operative time was 105 min, with no change of position and no contralateral incision.

Patient 2 (ELS). Contrast-enhanced CT showed a soft-tissue mass anterior to the spine at the level of T7–T10, crossing the midline and lying mainly in the right hemithorax, measuring 43 × 14 × 42 mm (about 31 mm on the right, extending about 12 mm into the left hemithorax). It was supplied by a 2.3-mm branch of the thoracic aorta, and no separate contralateral feeding artery was seen. The lesion was resected completely in one stage by right thoracoscopy; operative time was 80 min, with no change of position and no contralateral incision.

Operative findings in the separate type

In the four patients in whom both sides met an indication, staged resection was performed at intervals of 6.7, 6.7, 15.2 and 16.4 months (median 11.0). The right side was treated first in two and the left in two, the choice being based on lesion volume: in all four the side with the larger product of the three diameters was treated first, the right being about 3.6 times the left in patients 3 and 6, whereas the left was larger in patients 4 and 5. Operative times were 135, 60, 90 and 110 min (median 100) for the first operation and 35, 50, 100 and 150 min (median 75) for the second.

In the other two, only one side met an indication and unilateral resection was performed. The contralateral lesion measured 4.5 × 5.5 × 7.1 mm in patient 7, in whom only the left S6 lesion was resected, and 13 × 6 × 9 mm in patient 8, in whom only the right S8 lesion was resected. The contralateral lesion was left in place in both and, at the last follow-up 17 and 6 months after operation, had neither enlarged nor resolved.

Pathological findings

Two patients (7 and 8) underwent resection on one side only, and the pathology on the operated side was CPAM in both (type III in patient 7, type II–III in patient 8). Both sides were resected in the other six: bilateral CPAM in two (patient 3, type III on the left and type II on the right; patient 6, type I on the left and type I–II on the right); BPS on one side with CPAM on the other in two (patient 4, ILS on the left and CPAM type II–III on the right; patient 5, ILS on the left and CPAM type II on the right); and bilateral BPS in two (ILS on both sides in patient 1, ELS on both sides in patient 2).

Agreement between prenatal and postnatal imaging

Patient 5 had no record of prenatal examination. The other seven had prenatal ultrasound at 19 to 28 weeks of gestation; both sides were reported in two (28.6%) and one side in five (71.4%). In all five in whom one side was reported, contrast-enhanced CT after birth showed a lesion on the contralateral side as well (Table 1).

Perioperative outcome

The eight patients underwent 12 operations, all completed thoracoscopically, with no conversion to thoracotomy, an estimated blood loss below 5 mL in every case, no transfusion and no perioperative complication. Postoperative hospital stay was 3 to 7 days (median 4) and chest drainage 2 to 3 days. At a follow-up of 6 to 85 months (median 32) there was no residual lesion on the resected side, no new lesion and no reoperation.

Literature review

The search returned 591 records, 430 after removal of duplicates; 353 were excluded at initial screening and 59 at the second, leaving 18 reports of 19 patients (Table 2). Two investigators independently extracted the number of patients, sex, age, type of lesion, treatment, the continuous structure described and the pathological diagnosis on each side, and disagreements were resolved by reviewing the full text. Because every report described a single case, no quantitative synthesis or quality scoring was performed, and items not reported in the original were recorded as not reported.

A continuous structure anterior to the spine was described in 10 reports (11 patients); in the remaining eight patients no continuous structure was seen or reported. Classified by the structure described, six patients had parenchymal continuity, seven vascular continuity and two continuity through a fistula, four of them having more than one type. Parenchymal continuity was usually a bridging isthmus, a transmidline band of tissue or a lesion that itself crossed the midline; vascular continuity was usually a common arterial or venous trunk or a common supply to both sides.

Resection of both sides through one pleural cavity was the most frequent strategy (six patients, four thoracoscopic and two open); in one patient one side was resected through a unilateral approach and only the feeding artery of the contralateral side was ligated. Four patients had both sides resected through a bilateral approach in one session and three in two sessions. Two had no resection: one was treated by endovascular embolisation, and in the other one side was observed and the other only biopsied. In two the two sides were resected in one session without the side of the approach being stated, and in one the operation was deferred. The type of continuous structure, the treatment and the diagnosis on each side are given in Table 2.

Discussion

Our experience with these eight patients suggests that preoperative assessment of bilateral disease should begin with one question: is there a continuous structure linking the two sides anterior to the spine? If there is, the extent of resection is already fixed by the anatomy, and what remains to be decided is the side of the approach and whether to complete the operation in one stage. If there is not, whether and when to operate must be decided for each side on its own indication.

The nature of the link differed between our two patients with continuous lesions. Patient 1 had vascular continuity: an aberrant arterial trunk divided anterior to the spine into two branches entering the two hemithoraces, so that either side can be dealt with only after the trunk has been controlled, and dividing one branch leaves the other still attached to the trunk. Patient 2 had continuity of the lesion itself: a single lesion crossed the midline, the components in the two hemithoraces belong to the same lesion, and there are not two lesions that can be counted separately. The patient was included as a bilateral case because the lesion occupies both hemithoraces and is easily mistaken for a unilateral one. One link was a vessel and the other the lesion itself, but in neither could the two sides be divided by side.

Such lesions are not isolated reports. Amano et al. [15] described two ILS that projected through the inferior pulmonary ligament into the posterior mediastinum and the contralateral thorax respectively and could be drawn back and resected on their own side after ligation of the aberrant artery — the same principle as in our patient 1, in whom the vascular branches were followed to the opposite side. The bridging isthmus reported by Ahn et al. [16] was, by contrast, a parenchymal connection. Our patient 2 had an ELS, histologically unlike the ILS cases above but morphologically similar: the lesion crosses the midline and turns the two hemithoraces into a single operative field. In the transvertebral isthmus reported by Bleve et al. [17], arterial supply and venous drainage were defined by three-dimensional vascular reconstruction before thoracoscopic resection through the left chest, a transmidline lesion of the same kind as our patient 2. These lesions should not be grouped with horseshoe lung, in which the two lower lobes are fused through a pulmonary isthmus and which is often accompanied by right lung hypoplasia and the scimitar syndrome [16].

The position of the continuous structure also influences the approach. When the structure lies near the midline, the vascular pedicles of both sides can usually be reached through one pleural cavity, which is why both of our patients were completed through one side; Guo et al. [18] drew the left lesion into the right chest through the space between the descending aorta and the oesophagus, following the same anatomical route. Suzuki et al. [12], whose two sides drained through a common trunk into the right inferior pulmonary vein, nevertheless chose a bilateral approach, and in the patient of Joy et al. [19], whose two sides communicated through a fistula, the right side was resected through the right chest and the left aberrant artery ligated, the left lesion being left in place. The continuous structure determines the extent of resection that is feasible; timing and approach still depend on the experience and judgement of the surgeon.

Evidence on the indications in the separate type is weak. Imaging cannot reliably distinguish CPAM from type I pleuropulmonary blastoma [20]; there is no international guideline for CPAM, and the APSA systematic review found no level I or II evidence comparing operation with observation for asymptomatic CPAM [21]. The divergence has not narrowed since: a 2026 systematic review of 298 conservatively managed cases reported a complication rate of 16% and conversion to operation in 20% [22], the CONNECT randomised trial is still recruiting [23], and the APSA symposium of that year was still entitled “current controversies” [24]. We therefore framed our indications as operational items. “Asymptomatic with a maximum diameter greater than 20 mm” is taken directly from the Chinese consensus recommendation for unilateral CPAM [14], and the other three correspond to its criteria for terminating conservative observation; that item, however, rests on level 1B evidence and concerns unilateral disease, and its use in bilateral cases still requires external validation.

Staged operation was our first choice in the separate type. One-stage bilateral approaches remain feasible in selected patients but require two positionings and two periods of one-lung ventilation, which children tolerate only to a limited degree; once both pleural cavities have been opened the impairment of respiratory mechanics is compounded, and a leak, bleeding or chylothorax is more difficult and more hazardous to manage than after a unilateral operation. In the literature, both sides were completed through a bilateral approach in one session in four patients: Suzuki et al. [12] because of a common venous trunk; Stern et al. [25] because both sides were supplied by the coeliac trunk; Woerner et al. [26], who completed both sides through bilateral thoracotomy under one anaesthetic, and Morse et al. [27], who completed bilateral thoracoscopic sequestrectomy after repositioning under the same anaesthetic. When the two sides were independent most were still completed in stages or through a unilateral approach, and in a further two the two sides were completed in one session without the side of the approach being stated (Gudbjartsson et al. [28], Parikh et al. [29]).

The price of staging is that the contralateral lesion persists during the interval: in Morse et al. [27] both resected specimens showed severe inflammation, indicating that an asymptomatic lesion is not quiescent. The risk of leaving a contralateral lesion in place is not confined to inflammation: in Ganga et al. [30] a left CPAM had never been operated on, and a type III pleuropulmonary blastoma developed on the contralateral side in adolescence. Leaving a small contralateral lesion alone rests on the consensus recommendation for asymptomatic CPAM [14]; our two such patients have been followed for only 17 and 6 months and have no histological confirmation, so their long-term outcome remains uncertain.

A prenatal report of a unilateral lesion does not mean that the lesion is unilateral after birth. Of the seven patients with prenatal records, both sides were explicitly reported in only two (28.6%), and in the five in whom one side was reported, contrast-enhanced CT after birth confirmed a lesion on the other side as well. The prenatal detection rate of multiple lesions in the literature is 12.9% to 36.8% [31, 32]; our figure lies within that range, and underestimation of bilateral fetal lung lesions prenatally has been reported before [33]. When a unilateral lesion is suggested prenatally, both lungs should therefore be assessed completely by contrast-enhanced CT after birth.

This study has limitations. It is single-centre and retrospective, with only eight patients, and cannot compare one-stage with staged operation. The contralateral lesion was judged against a threshold (> 20 mm) taken from the consensus recommendation for unilateral CPAM and not validated externally in bilateral disease. The literature review is narrative and subject to reporting bias, and most single case reports did not give lesion diameters, so the relation between lesion size and procedure could not be analysed.

Conclusions

Preoperative decisions in children with bilateral congenital lung lesions begin with the question whether a continuous structure links the two sides anterior to the spine. If there is one, the lesion is of the continuous type and both sides can be resected through the pleural cavity on the side of the structure. If there is none, the lesion is of the separate type and the strategy is set by the indication on each side: staged operation is preferred when both sides qualify, and when only one side qualifies only that side is treated, with long-term follow-up of the other. When a unilateral lesion is reported prenatally, both lungs should be assessed completely by contrast-enhanced CT after birth.

Declarations

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Competing interests

The authors have no relevant financial or non-financial interests to disclose.

Ethics approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The study was approved by the Ethics Committee of Capital Center for Children's Health, Capital Medical University (approval no. SHERLLM2024028).

Consent to participate

The requirement for informed consent was waived by the ethics committee in view of the retrospective nature of the study, and all procedures were part of routine care.

Consent to publish

Not applicable. All images are anonymised and contain no identifying information.

Data availability

The data that support the findings of this study are not publicly available because they contain information that could compromise the privacy of the patients, but are available from the corresponding author on reasonable request.

Author contributions

Qipeng Zheng: Conceptualization, Methodology, Investigation, Data curation, Writing – original draft. Zhenhua Cao: Investigation, Data curation. Meng Chen: Investigation, Data curation. Hua Zhang: Investigation. Yan Zhou: Investigation. Zexi Li: Investigation. Yun Su: Investigation. Jing Liu: Investigation. Yurui Wu: Conceptualization, Supervision, Writing – review and editing. All authors read and approved the final manuscript.

Declarations of interest

The authors have no relevant financial or non-financial interests to disclose.

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Tables

Table 1 Clinical, imaging, operative and pathological data of the eight children with lesions in both hemithoraces

No.	Sex	Type	Age (mo)	Prenatal US (GA; side)	Left lesion (segment; mm)	Right lesion (segment; mm)	Operation (approach; interval, mo)	Pathology	Follow-up (mo)
1	M	Continuous	7.7	20 wk; unilateral	S10; 41.5×42.1×43.7	S10; 15.2×23.1×20.0	L; –	ILS both	24
2	M	Continuous	4.8	28 wk; unilateral	–; 12×14×42	–; 31×14×42	R; –	ELS both	73
3	M	Separate	20.2	24 wk; bilateral	S10; 21×14×16	S5, S10; 25×25×26; 38×20×22	R→L; 15.2	CPAM both (L III, R II)	71
4	M	Separate	5.4	24 wk; bilateral	S10; 33×24×31	S2; 30×19×21	L→R; 6.7	L ILS; R CPAM II–III	40
5	F	Separate	94.8	None	S10; 60×55×60	S10; 62×29×30	L→R; 16.4	L ILS; R CPAM II	19
6	M	Separate	7.7	28 wk; unilateral	S10; 33×29×23	S1, S2; 41×30×64	R→L; 6.7	CPAM both (L I, R I–II)	85
7	M	Separate	5.3	19 wk; unilateral	S6; 32.8×45.4×23.5	S10; 4.5×5.5×7.1	L; –	CPAM III (left)	17
8	F	Separate	58.0	20 wk; unilateral	S1+2; 13×6×9	S8; 31.5×28.9×32.1	R; –	CPAM II–III (right)	6

GA, gestational age; US, ultrasonography; S, segment; ILS, intralobar sequestration; ELS, extralobar sequestration; CPAM, congenital pulmonary airway malformation; mo, months; wk, weeks; –, not applicable.

Table 2 Bilateral congenital lung lesions reported in the literature

Author	Year	n	Sex	Age	Type	Treatment	Left diagnosis	Right diagnosis
Pendse et al[34]	1972	1	F	2.5 y	Separate	Both sides via unilateral approach, one stage (thoracotomy)	ELS	ILS
Trudel et al[13]	1977	1	M	15 y	Continuous (vascular)	Two-stage, bilateral approach (thoracotomy)	ELS	ILS
Spinella et al[35]	1998	1	M	Neonate	Separate	Two-stage, bilateral approach (thoracotomy)	ELS	ILS
McLean et al[11]	2004	1	M	6 mo	Continuous (parenchymal + vascular)	Both sides via unilateral approach (thoracotomy)	ELS	CPAM
Joy et al[19]	2005	1	F	1 mo	Continuous (vascular + fistula)	Laparotomy with division of the gastrobronchial fistula, right thoracotomy with resection of the right middle and lower lobes, and ligation of the left aberrant artery	ILS	ILS
Morse et al[27]	2006	1	F	7 y	Separate	Both sides resected thoracoscopically in one session with repositioning	ILS	ILS
Stern et al[25]	2007	1	NR	7 mo	Continuous (vascular)	One-stage, bilateral approach (thoracotomy)	ILS	ILS
Gudbjartsson et al[28]	2007	1	F	Neonate	Continuous (fistula)	Both sides resected, one stage (approach NR)	ELS	ELS
Woerner et al[26]	2008	1	F	7 mo	Separate	Both sides through bilateral thoracotomy, one session	ILS	ILS
Ahn et al[16]	2014	1	F	13 y	Continuous (parenchymal + vascular)	Endovascular embolisation, no operation	ILS	ILS
Parikh et al[29]	2014	1	M	14 mo	Separate	Both sides resected thoracoscopically, one stage (approach NR)	ELS	ILS
Amano et al[15]	2017	2	M, F	19, 18 mo	Continuous (parenchymal)	Both sides via unilateral approach (thoracoscopy)	ILS	ILS
Bleve et al[17]	2021	1	F	3 y	Continuous (parenchymal)	Both sides resected through a left unilateral approach (thoracoscopy)	ELS	ELS
Guo et al[18]	2024	1	F	9 y	Continuous (parenchymal + vascular)	Both sides via unilateral approach (thoracoscopy)	ELS	ILS

Suzuki et al[12]	2025	1	M	1 y	Continuous (vascular)	One-stage, bilateral approach (thoracoscopy)	ELS	ILS
Castillo Valencia et al[36]	2026	1	F	14 y	Separate	Two-stage, bilateral approach (thoracotomy)	CPAM (type 2)	CPAM (type 2)
Ganga et al[30]	2026	1	M	Early adolescence	Separate	Left side observed; right side thoracoscopic biopsy only	CPAM (clinical diagnosis)	PPB type III
Hirotani et al[37]	2026	1	F	Neonate	NR	Operation deferred after conservative observation (extent not specified)	CPAM (clinical diagnosis)	CPAM (clinical diagnosis)

CPAM, congenital pulmonary airway malformation; ELS, extralobar sequestration; ILS, intralobar sequestration; PPB, pleuropulmonary blastoma; NR, not reported; y, years.

Figures

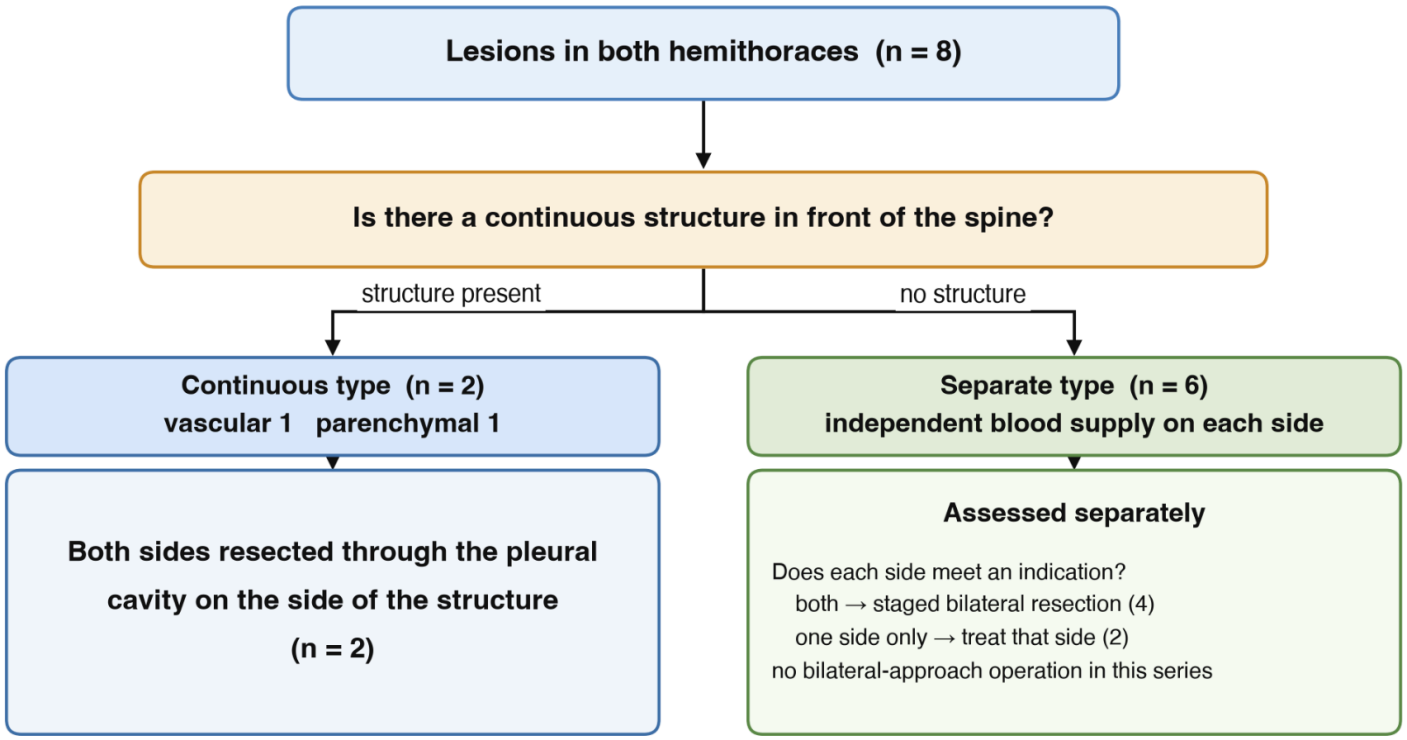


Figure 1

Classification of bilateral congenital lung lesions and the resulting decision pathway at our institution. All eight patients had lesions in both hemithoraces; the first step was to establish whether a continuous structure links the two sides anterior to the spine. When present, the lesion is of the continuous type (two patients, one vascular and one parenchymal); the extent of resection is fixed by the anatomy, the two sides cannot be divided by side, and both patients were completed through the pleural cavity on the side of the structure. When absent, the lesion is of the separate type (six patients) and the indications are assessed separately: both sides met an indication in four and were resected in two stages, and only one side met an indication in two and only that side was treated, the contralateral lesion being observed

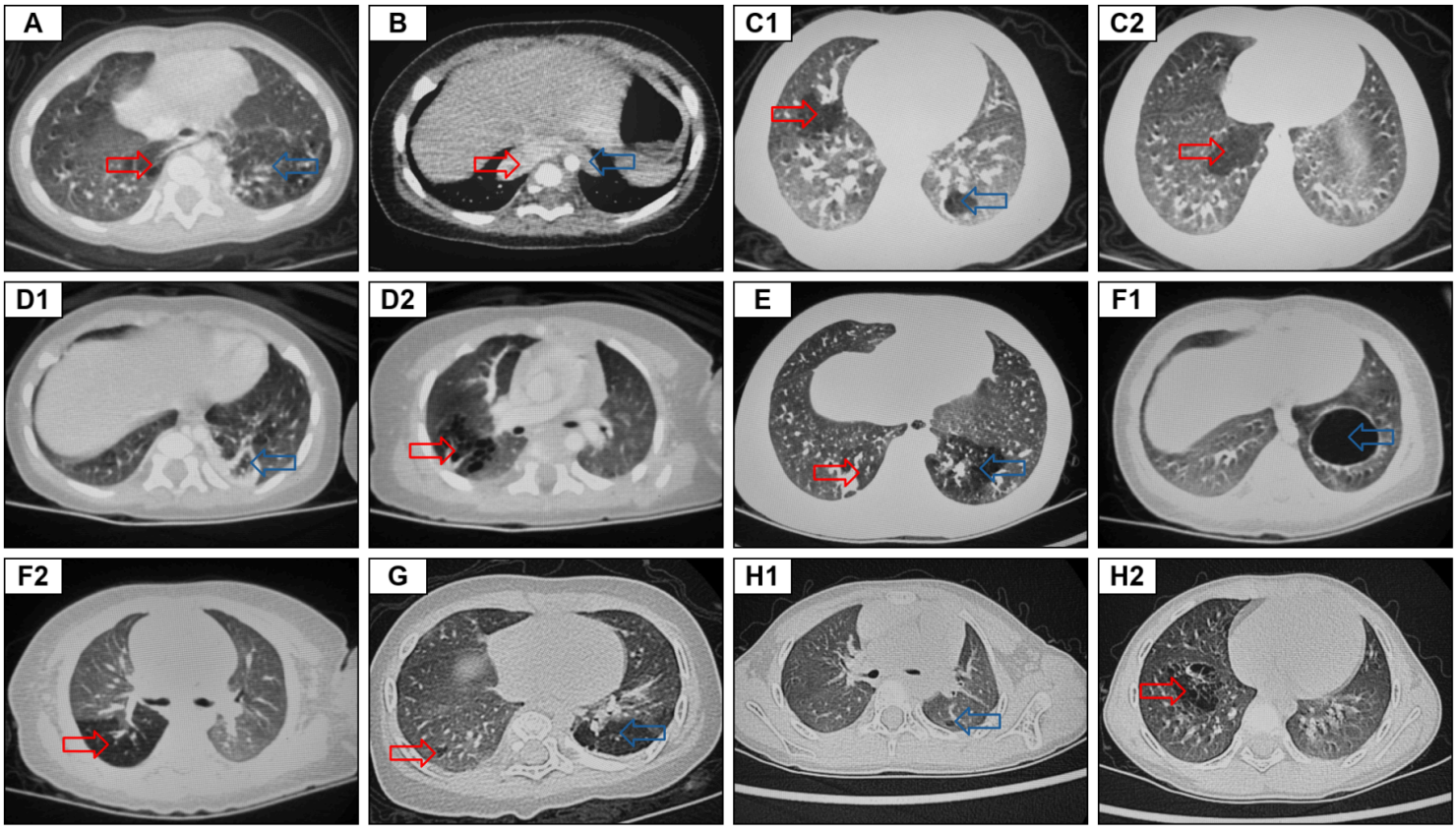


Figure 2

Preoperative chest computed tomography (lung window) of the eight patients. A to H correspond to patients 1 to 8; C1/C2, D1/D2, F1/F2 and H1/H2 are different sections of the same patient. Red arrows indicate the right-sided lesion and blue arrows the left-sided lesion