長庚醫療財團法人
基隆長庚紀念醫院

肺阻塞診治指引

基隆胸腔內科 編定

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目 錄

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第一節 肺阻塞的定義

肺阻塞是不完全可逆的呼吸道阻塞疾病，其機轉為吸入香菸或其他有害微粒或氣體引發肺臟及呼吸道慢性發炎(1)。除暴露外，個體宿主的易感性也會導致肺阻塞的發生，包括基因異常、肺發育異常和加速老化。依據目前的定義要診斷肺阻塞需有肺量計檢查顯示吸入支氣管擴張劑之後用力 呼氣一秒量/用力呼氣肺活量(FEV1/FVC) 小於0.7，代表病人有不完全可逆之呼氣氣流阻塞。(2-11)

依據2022年GOLD guideline，肺阻塞患者又分出早期慢性肺阻塞(early COPD)、輕度慢性肺阻塞(mild COPD), 年輕族群肺阻塞(COPD in young people), 及慢性肺阻塞前期(pre-COPD)等次族群，並強調「及早發現、及早治療便能有效控制」(1)。

第二節肺阻塞的診斷

一、 症狀與病史

(1) 典型症狀: 慢性咳嗽、咳痰及慢性且漸進性的呼吸困難

(2) 高危險族群：抽煙、空氣污染、粉塵暴露或煙霧暴露者(煮飯油煙等)

(3) 同時合併(1) + (2) 者，應接受檢查以找出病因，並接受適當治療。

二、 身體檢查:

典型理學檢查發現：呼吸有喘鳴聲音，胸廓前後徑增加，痰音，杵狀指。

三、 肺功能檢查

建議等級	臨床建議內容
1A	建議應該要使用支氣管擴張試驗後 FEV1/FVC 比值來診斷肺阻塞： FEV1 / FVC 小於 0.7 。(必要診斷)
1B	1. FEV1 可逆程度不應該被用來排除肺阻塞的診斷。 2. FEV1 / FVC 小於 0.7 的肺阻塞病人，呼氣氣流受阻之嚴重程度分級是根據吸入支氣管 擴張劑後之 FEV1 來決定： GOLD 1 (輕度): FEV1≥80%預測值。 GOLD 2 (中度): 50% ≤ FEV1 < 80% 預測值。 GOLD 3 (重度): 30%≤ FEV1 < 50%預測值。 GOLD 4 (極重度): FEV1 < 30% 預測值。Reference: (2-8)

四、影像學檢查

胸部X 光及胸部電腦斷層兩項檢查工具是最被廣泛使用及討論的肺阻塞影像學檢查。

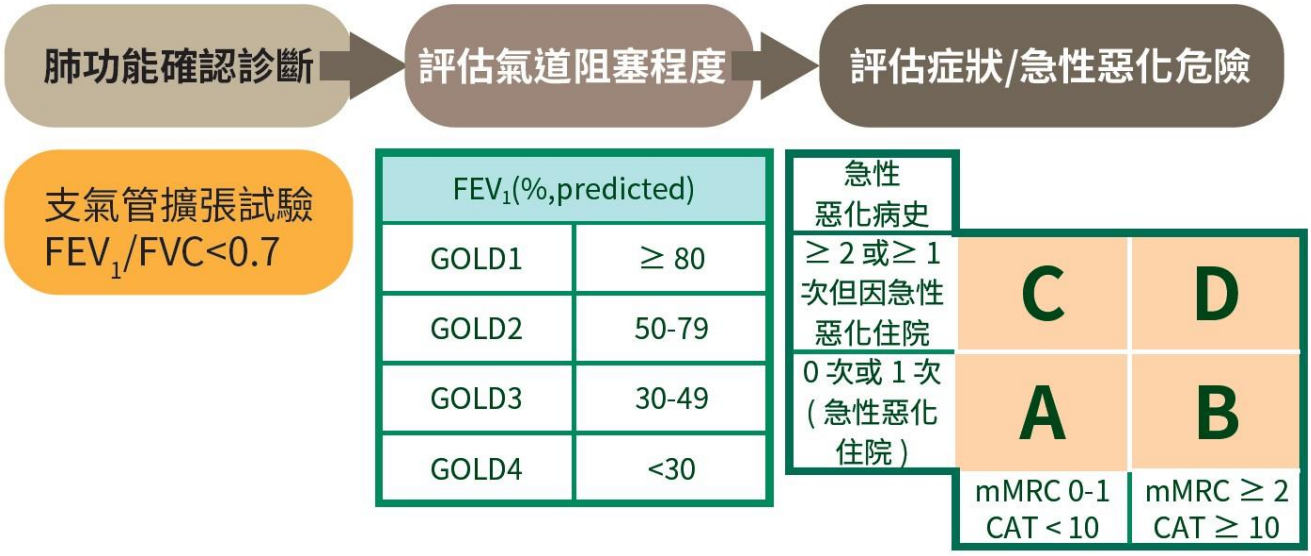
影像檢查	臨床建議內容
胸部X 光	可用於協助評估肺阻塞患者是否有其他的診斷或是合併其他心肺共病症。（肺阻塞的疾病診斷並無法藉由胸部X 光檢查來確立）
電腦斷層	肺阻塞確定診斷後之病人，可以使用胸腔電腦斷層之定量性指標來區分肺阻塞之亞型，包括：肺氣腫、氣體滯積及小氣道異常，以及評估急性惡化、肺移植與外科肺減容積手術前肺 氣腫分布範圍、共病表現和疾病進展。(Reference: 27-37)

第三節肺阻塞的評估

一、評估參數:

評估參數	肺阻塞的評估應包含下列要素
症狀	mMRC & CAT 問卷量表
呼氣氣流受阻	肺量計檢查評估（spirometry with bronchodilator test）
急性惡化	過去急性惡化病史是預估未來是否會有頻繁急性惡化（每年 2 次以上）的最佳預測工具
共病症	台灣TOLD研究分析，包括症狀、肺功能、共病症等整體評估才能真正反應病人的狀況。
血液嗜酸性白血球	可用來評估是否要使用ICS 在肺阻塞的治療。
整合性評估	如表1-1 所示。

表1-1 COPD 整合性評估



二、表現型

1. 哪些臨床表現型對於診斷後之評估與治療是有幫助的？

GRADE建議等級	臨床建議內容
1A	頻繁惡化表現型(每年有兩次或大於兩次之惡化)應列入肺阻塞評估之項目。(強建議，證據等級強)

*註1：頻繁惡化表現型：每年有兩次或大於兩次之惡化。肺阻塞頻繁惡化表現型及全身炎症表現型，與預後相關。FEV_1 快速逐年下降表現型、慢性支氣管炎和肺氣腫的表現型、喘鳴表現型、超重和肥胖等，與疾病進展和急性惡化次數相關。周邊血液嗜酸性球高低表現型、肺微生物 群、與藥物治療之反應與選擇相關。(38-43)

第四節肺阻塞的篩檢

一、應用於成人的篩檢方式包括：

1. 使用良好設計之篩檢性問卷進行疾病發生風險之評估
2. 篩檢性肺量計檢查(screening spirometry)

二、不建議對無症狀成人進行肺阻塞篩檢。

1. 對於無症狀成人，進行肺阻塞篩檢，潛在危害不高，但尚無證據顯示具有臨床效益。
2. 針對高風險族群，進行症狀篩檢，有助於早期發現中重度肺阻塞病人。
3. 對於已有慢性咳嗽、咳痰、呼吸困難、呼吸喘鳴聲，等呼吸道症狀的病人及具有抗胰蛋白酶缺乏症家族病史之病人，應立即安排肺功能及影像學檢查。

第二章 穩定期肺阻塞的治療與處理

穩定期肺阻塞的治療目標在於減低肺阻塞所導致的症狀及風險。藉由藥物和非藥物治療，以期達到緩解症狀、改善運動耐受力、改善健康狀態、預防疾病進程、預防及治療急性惡化及降低致死率等目標。

(1) 藥物：分為吸入型藥物及口服藥物。
(2) 非藥物治療：包括病人教育、戒菸、疫苗注射、肺復原、氧氣及呼吸器治療等。

第一節 藥物治療

穩定期肺阻塞的藥物治療依給藥途徑可分為吸入型藥物及口服藥物。
吸入型藥物主要是吸入型支氣管擴張劑和吸入型類固醇。穩定期肺阻塞的吸入型藥物以長效型的藥物為主。

表 2-1 臺灣常用的穩定期肺阻塞之吸入型藥物

縮寫	全名	藥品	作用時間 / 用法
SABA	Short-Acting Beta2-Agonist 短效乙二型 交感神經刺激劑	Fenoterol (100μg / 噴 , MDI)	4-6 小時 /2 噴 Q4-6 小時 p.r.n.
		Salbutamol (100μg / 噴 , MDI)	4-6 小時 /2 噴 Q4-6 小時 p.r.n.
SAMA + SABA	Short-Acting Muscarinic Antagonist + Short-Acting Beta2-Agonist 短效抗膽鹼藥物合併短效乙二型交感神經刺激劑	Ipratropium bromide-Salbutamol (20/120μg / 噴 , MDI)	6-8 小時 /1 劑 Q4-6 小時 p.r.n.
LABA	Long-Acting Beta2-Agonist 長效乙二型 交感神經刺激劑	Indacaterol (150μg / 劑 , DPI)	24 小時 /1 劑 QD
		Olodaterol (2.5μg / 噴 , SMI)	24 小時 /1 噴 QD
LAMA	Long-Acting Muscarinic Antagonists 長效抗膽鹼藥物	Glycopyrronium bromide (50μg / 劑 , DPI)	12-24 小時 /1 劑 QD
		Tiotropium (2.5μg / 噴 , SMI)	24 小時 /2 噴 QD
		Umeclidinium (55μg / 劑 , DPI)	24 小時 /1 劑 QD

ICS + LABA	Inhaled corticosteroid+ Long-Acting Beta2-Agonist 吸入型類固醇合併長效乙二型交感神經刺激劑	Formoterol-beclomethasone (6/100μg / 噴 , MDI, DPI)	12 小時 /2 噴 BID
		Formoterol-budesonide (4.5/160μg / 劑 , DPI, MDI)	12 小時 /2 劑 BID
		Salmeterol-fluticasone propionate (25/250μg / 噴 , MDI; 50/250μg / 劑 , DPI)	12 小時 /2 噴 BID/1 劑 BID
		Vilanterol-fluticasone furoate (25/100μg / 劑 , DPI)	24 小時 /1 劑 QD
LABA+ LAMA	Fixed-dose Dual bronchodilator 固定劑量複方長效支氣管擴張劑	Indacaterol-glycopyrronium (110/50μg / 劑 , DPI)	12-24 小時 /1 劑 QD
		Vilanterol-umeclidinium (25/62.5μg / 劑 , DPI)	24 小時 /1 劑 QD
		Olodaterol-tiotropium (2.5/2.5μg / 噴 , SMI)	24 小時 /2 噴 QD
LABA+ LAMA+ ICS	Long-Acting Beta2-Agonist + Long-Acting Muscarinic Antagonists+ Inhaled corticosteroid 三合一藥物	Vilanterol-umeclidinium-fluticasone furoate (22/55/92μg/ 劑 , DPI)	24 小時 /1 劑 QD

MDI=metered dose inhaler 定量噴霧吸入器; DPI=dry power inhaler 乾粉吸入器; SMI=soft mist inhaler 霧化液吸入器; p.r.n.=as needed 視需要

一、 **吸入型支氣管擴張劑** 吸入型支氣管擴張劑可分為乙二型交感神經刺激劑和抗膽鹼藥物，此兩類藥物均有長效劑型和短效劑型。

吸入型藥物	臨床建議內容
短效型支氣管擴張劑	● 包含了SABA 與SAMA，兩者對於肺功能改善的程度類似，均可有效改善病人的症狀、肺功能及運動耐受性。 ■ 建議處方給所有的肺阻塞病人短效型支氣管擴張劑，作為急性惡化時的用藥。SABA 或 SAMA 可以單獨或合併 (SABA+SAMA)，合併使用有加成效果。 ■ SABA 可能會增加心律不整的風險 ■ SAMA 也可能會增加心臟血管相關併發症的風險 ● 可用於協助評估肺阻塞患者是否有其他的診斷或是合併其他心肺疾病
長效型支氣管擴張劑	● 當短效型支氣管擴張劑間歇使用仍無法有效控制症狀，或疾病嚴重程度較高 (包含症狀及急性惡化病史)，建議常規使用長效型支氣管擴張劑。長效型支氣管擴張劑包含了 LABA 與 LAMA。 ● LABA 可以改善病人肺功能、生活品質、運動耐受力與急性惡化頻率，其安全性與安慰相當。 ■ 可能的副作用包括加重心律不整、身體顫抖、低血鉀等。 ● LAMA 可以改善病人的肺功能、減少肺部過度充氣、減輕症狀及急性惡化、改善生活品質，改善肺復原的效果，並能減緩輕中度肺阻塞病人肺功能下降的速率 ■ 主要的副作用是口乾。 ● LAMA 與 LABA 兩者相較，在改善病人的肺功能、症狀緩解、生活品質、住院率及死亡率方面並無明顯差異；但是 LAMA 較能有效預防急性發作，而且副作用較少。
固定劑量複方長效支氣管擴張劑	● 固定劑量複方長效支氣管擴張劑是將 LABA 與 LAMA 組合置於同一吸入器(LABA+LAMA)。在改善肺功能、生活品質、控制症狀和降低急性惡化風險上均優於單一支氣管擴張劑，而且單方與複方在安全性上並無差異。 ● 使用單一支氣管擴張劑後，病人症狀仍控制不佳或反覆急性惡化，可改用固定劑量複方長效支氣管擴張劑。 ● 在症狀較嚴重的病人，建議可優先使用固定劑量複方支氣管擴張劑。

二、 吸入型類固醇

下列肺阻塞病人可考慮使用吸入性類固醇合併長效乙二型交感神經刺激劑
經常急性惡化且血液（或痰液）中嗜酸性球增高的高風險肺阻塞病人之起始治療: 每年有2次或以上的急性惡化，或曾因此住院一次或以上的病人，而且血液中嗜酸性球≥ 300 顆/μL。
已使用一種或兩種長效型支氣管擴張劑後仍持續有急性惡化之後續治療: 1. 已使用 LABA 或 LAMA，而且: A. 血液中嗜酸性球數≥ 300 顆/μL 的病人。*註1 B. 或血中嗜酸性球數≥ 100 顆/μL，而且過去一年有2 次或以上的急性惡化，或曾因此住院一次或以上的病人；若仍有急性惡化，應考慮改為ICS+LABA。 2. 已使用 LABA+LAMA 兩種長效型支氣管擴張劑的肺阻塞病人，而且血液中嗜酸性球數≥ 100 顆/μL；若仍有急性惡化，應考慮加上ICS 做三合一治療。(LABA+LAMA+ICS)

*註 1：血液嗜酸性球數愈高的病人，對 ICS+LABA 的治療效果可能愈好。血液中嗜酸性球數與 ICS 效果之間存在正向關係：當血液中嗜酸性球數< 100 顆/μL 時，ICS 之療法的效果極小或無效果；血液中嗜酸性球數≥ 300 顆/μL 的界限值則可用對於識別最可能受益於 ICS 治療的病人。對於持續使用 LABA+LAMA+ICS 之穩定期肺阻塞病人，若其血液中嗜酸性球< 300 顆/μL，建議在適當的評估後可考慮停止ICS。

長期使用 ICS 可能使發生肺部感染（肺炎及肺結核）的機會增高，並可能造成口腔局部副作用（念珠菌感染及聲音沙啞）。肺炎發生的機率與使用 ICS 的劑量高低及時間長短、年齡較大、吸菸狀況、身體質量指數（BMI）較低、肺功能較差、及先前的急性惡化和肺炎病史有關。

三、 口服藥物

表2-2 臺灣常用的穩定期肺阻塞之口服藥物

縮寫	全名	藥品	作用時間/用法
OCS	Oral corticosteroid 口服類固醇	Prednisolone (5mg) Methylprednisolone (4mg)	3 小時 1.8-5.2 小時
	* 急性發作時使用，無法減少急性惡化的頻率，應使用最低有效劑量和最短療程。 * 長期使用口服類固醇一年以上可能會增加死亡風險和脊椎骨折風險，故建議不應常規使用		
	Oral Beta2-Agonist 口服乙二型交感神經刺激劑	Procaterol (25μg) Fenoterol (2.5mg)	12 小時/1# BID 4-6 小時/1#TID
	* 口服乙二型交感神經刺激劑是較不優先的建議。 * 以吸入型藥劑為主(LABA or SABA)		
	Theophylline 茶鹼	Theophylline (125/200/250mg) Aminophylline (100mg)	變化的,可高達24時/1#QD-BID 變化的/1#QD-QID
	*口服茶鹼有抗發炎和輕微支氣管擴張作用，其單一或附加治療可改善穩定期肺阻塞病人的肺功能和運動耐受性，並且降低急性惡化的風險。		
PDE4 inhibitors	type 4 PhosphoDiEsterase inhibitor 第四型磷酸二酯酶抑制劑	Roflumilast (500μg)	17 小時/1# BID
	* 有抗發炎和輕微支氣管擴張作用，其單一或附加治療，可以改善肺功能、急性惡化頻率、和生活品質。		
	Macrolide 大環內酯類抗生素	Azithromycin (250mg) Erythromycin (250mg)	35-40 小時/1# QD 2-3.5 小時/2# BID
	* 有抗發炎作用，其附加治療六個月到一年可改善急性惡化頻率和生活品質。特別是對於已戒菸一年以上、FEV1 大於30%、或年齡超過65 歲者，有顯著效果。 * 對於穩定期肺阻塞病人，已使用 ICS、LABA 和 LAMA 合併治療後，仍發生一次或以上之急性惡 化，可以使用大環內酯類抗生素（erythromycin 或 azithromycin）附加治療，來減少急性惡化的發生		
	Antioxidant mucolytic agent 抗氧化型化痰藥	N-AcetylCysteine (600mg) (NAC)	6.25 小時/1# BID
	* 可減少急性惡化頻率和改善生活品質，特別是對於未使用ICS或有抽菸病史者，有顯著效果。 * 對於穩定期肺阻塞病人，可以使用口服抗氧化型化痰藥（NAC）來降低急性惡化的風險、改善生活品質、和降低住院風險。		

口服類固醇在穩定期肺阻塞病人的短期使用，特別是對合併高嗜酸性球者，可以提昇肺功能，但是無法減少急性惡化的頻率；而長期使用會增加高血壓、糖尿病、骨質疏鬆和次發性感染的風險。對於不得不使用口服類固醇者，應使用最低有效劑量和最短療程，同時補充鈣片、維它命D 和雙磷酸鹽，來預防骨質疏鬆及骨折，並適時接受骨質密度檢查。

比起吸入性劑型，口服乙二型交感神經刺激劑是較不優先的建議。口服心臟選擇性（乙一型）比非心臟選擇性乙型交感神經阻斷劑較不會影響穩定期肺阻塞病人的肺功能；而且前者不會降低支氣管的可逆性，因此並非使用禁忌。對於穩定期肺阻塞合併冠狀動脈疾病或心衰竭之病人，可以使用心臟選擇性乙型交感神經阻斷劑來改善其預後，但應注意其肺功能是否下降。

口服茶鹼有抗發炎和輕微支氣管擴張作用，其單一或附加治療可改善穩定期肺阻塞病人的肺功能和運動耐受性，並且降低急性惡化的風險，但是也會增加胃腸道、心臟和神經系統之副作用。茶鹼可作為第二線藥物，但是應儘可能使用最低有效劑量，並監測血清濃度維持在8 到12 μg/mL 之間。應注意可能會提高茶鹼血清濃度的狀況，例如鬱血性心衰竭、肝病、年老、高碳水化合物飲食和某些藥物，以及可能會降低茶鹼血清濃度的狀況，例如抽菸、高蛋白質飲食、炙烤肉類、和某些藥物等。

口服第四型磷酸二酯酶抑制劑（roflumilast）有抗發炎和輕微支氣管擴張作用，其單一或附加治療，可以改善肺功能、急性惡化頻率、和生活品質，但是無法改善運動耐受力，也會增加胃腸道等副作用(腹瀉、噁心、體重減輕、頭痛)和停藥的比率。對於過去一年內曾經因急性惡化住院的病人而且是慢性支氣管炎(咳嗽有痰)的臨床表現型者，才會顯著降低急性惡化的風險。和茶鹼類似，其代謝會因合併使用細胞色素 c 氧化酶誘發劑(rifampicin, phenytoin)或抑制劑(clarithromycin, erythromycin, verapamil, cimetidine)而加快或減慢。

大環內酯類抗生素（erythromycin 或 azithromycin）有抗發炎作用，其附加治療六個月到一年可改善急性惡化頻率和生活品質。特別是對於已戒菸一年以上、FEV_1 大於 30%、或年齡超過 65 歲者，有顯著效果。長期使用應注意腹瀉、抗藥性細菌、QT 間期延長、和聽力減退的問題。

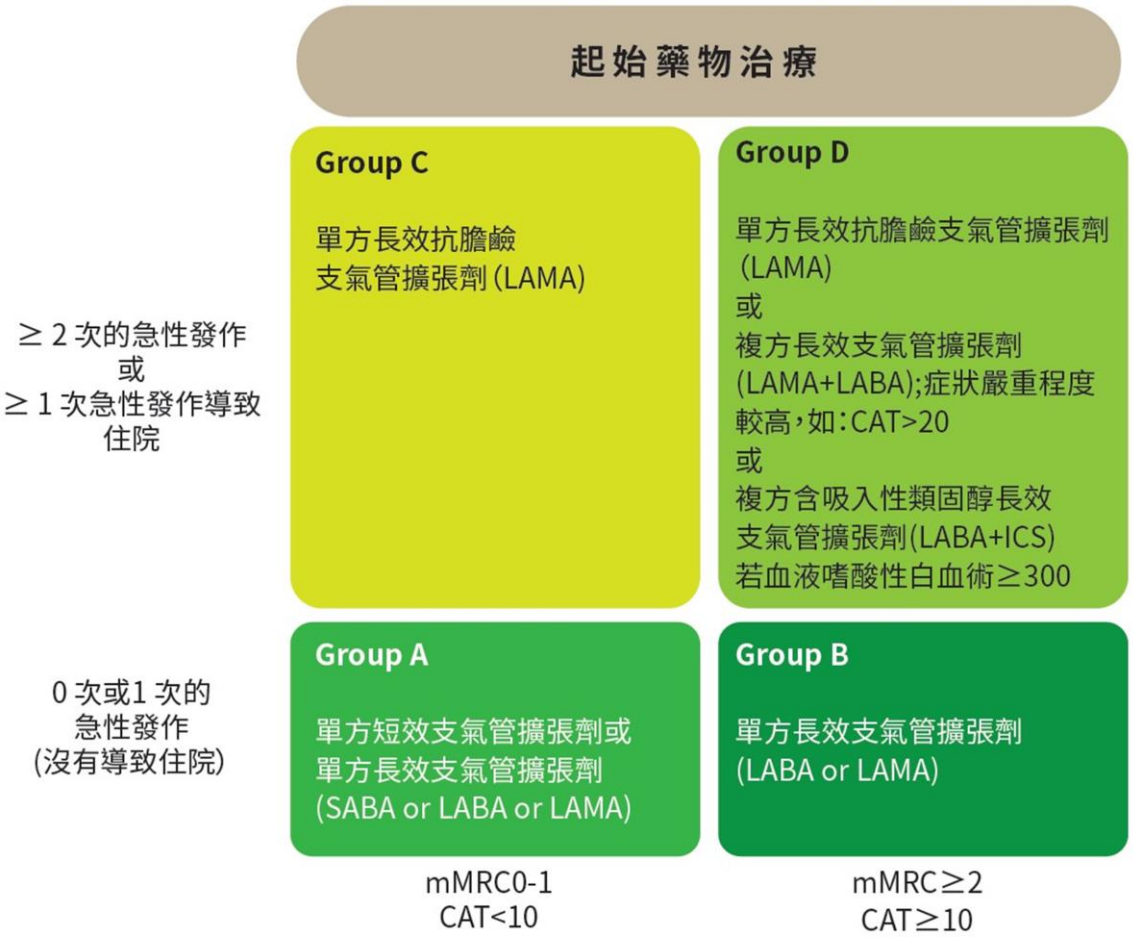
口服抗氧化型化痰藥，例如 NAC，可減少急性惡化頻率和改善生活品質，特別是對於未使用 ICS 或有抽菸病史者，有顯著效果。可能的副作用包括噁心、嘔吐和腹瀉。

對於末期穩定期肺阻塞病人（FEV_1 < 50%或 mMRC 4），已使用最佳藥物治療和接受肺復原治療（運動、厥嘴吐氣、助行器、胸壁震動、神經肌肉電刺激、血氧低下者給予氧氣），仍然有呼吸困難者，可考慮短期使用口服最低劑量鴉片類（opioids）藥物來改善，惟應注意其副作用和身體依賴性。

四、綜合建議

依據 2022 年 GOLD 診治指引，肺阻塞病人依其症狀和急性惡化風險分為 ABCD 四個不同族群，治療時應依據其族群類別給予不同的藥物作為起始治療（圖 2-1），再依據病人對藥物的反應，包含症狀及急性惡化風險的改善與否，來決定持續治療或調整藥物（升階或降階），如圖 2-2 和2-3。

圖 2-1 肺阻塞起始治療建議



起始藥物治療

A 族群

所有A 族群的病人必須給予短效或長效支氣管擴張劑來治療呼吸道症狀。

B 族群

1. 必須給予一種長效的支氣管擴張劑（LAMA 或 LABA）來治療。規則性使用長效支氣管擴張 劑比間歇性使用短效支氣管擴張劑的效果來得好。
2. 長效支氣管擴張劑的選擇取決於病人主觀症狀的改善。
3. 當單一種長效支氣管擴張劑無法有效改善病人症狀，建議可加上另一種長效支氣管擴張劑。
4. 當病人症狀較嚴重時，可考慮使用固定劑量複方支氣管擴張劑（LABA+LAMA）作為起始治療。
5. 必須找尋可能的共病症，因為共病症可能會加重病人的症狀並使預後變差。

C 族群

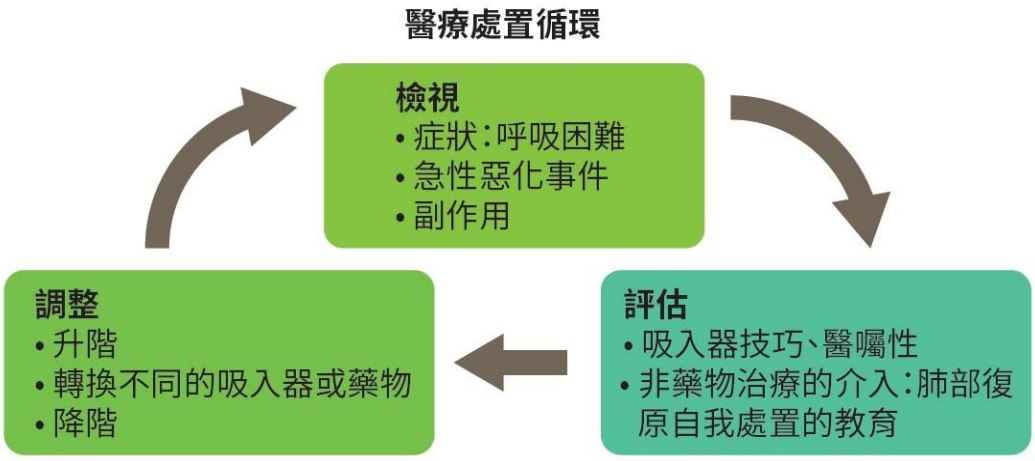
必須給予一種長效的支氣管擴張劑來治療。LAMA 預防急性惡化效果較 LABA 來的好，因此建議使用LAMA 來當起始治療。

D 族群

1. 建議使用LAMA 做為起始治療，因為LAMA 同時具有改善症狀及預防急性惡化的效果。
2. 對於症狀比較嚴重的病人（如CAT ≥ 20），因為LABA+LAMA 的治療效果比單一LAMA 來的好，可以考慮優先使用LABA+LAMA 做為起始治療。
3. 對於氣喘和肺阻塞重疊症(ACO)或血液中嗜酸性球增高（≥ 300 顆/μL）之病人，可以考慮使 用ICS+LABA 作為起始治療。
4. 因 ICS 可能會增加病人發生肺炎的風險，因此使用含 ICS 藥物作為起始治療時，必須考慮臨床效益與風險的評估。

追蹤藥物治療：後續的藥物追蹤治療應遵循檢視與評估，然後於必要時調整的原則(圖2-3)。

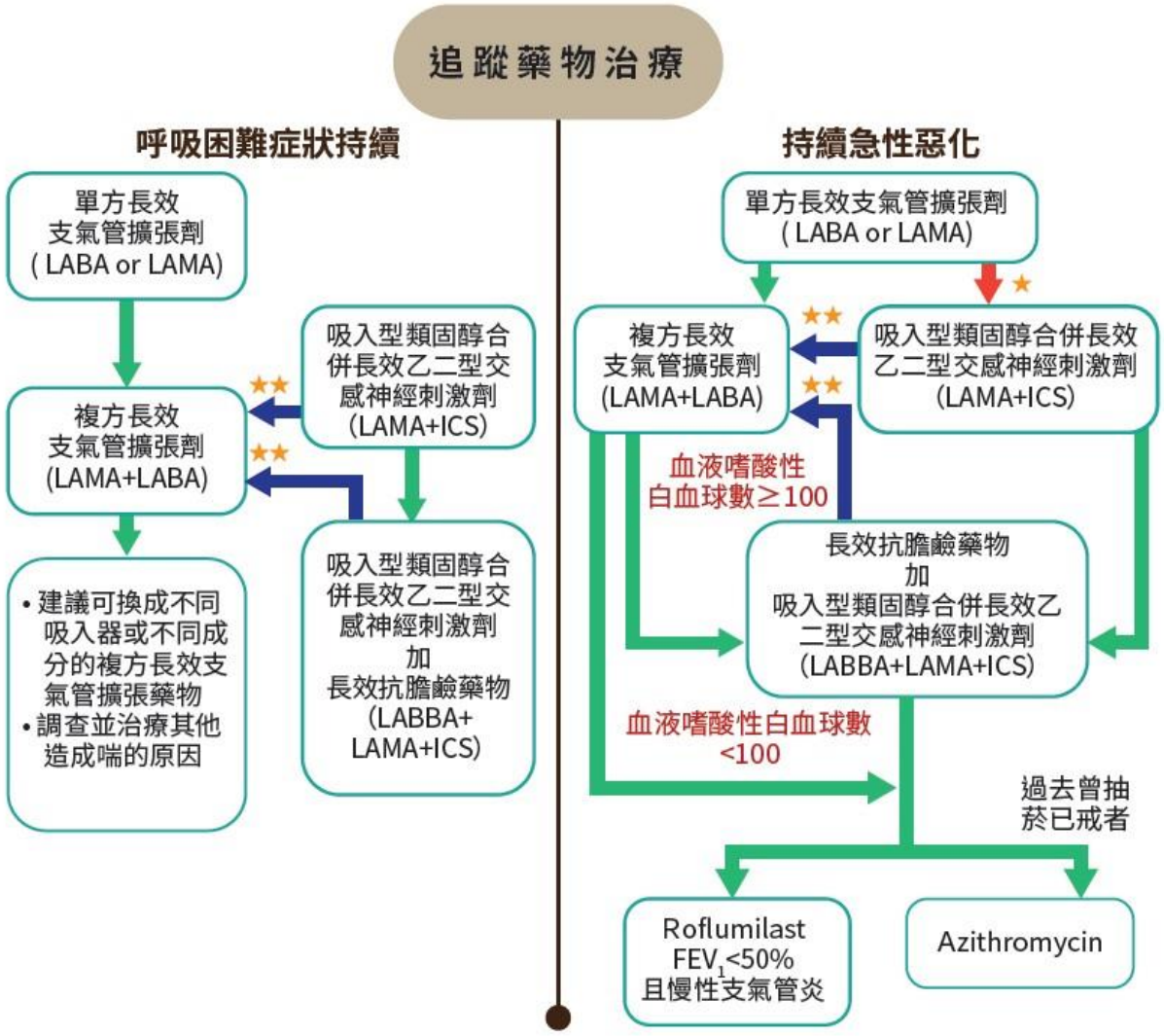
圖 2-1 肺阻塞醫療處置循環



病人接受藥物治療後，無論起始治療時屬於哪個族群，都應評估是否需要針對呼吸困難症狀或急性惡化發生及風險的改變來改變治療策略。調整治療策略的方式有兩種，可依呼吸困難症狀（圖2-2 左欄）或急性惡化的發生風險（2-2 右欄）的改變來調整治療方式；對於同時發生呼吸困難症狀與急性惡化風險改變的病人，應使用急性惡化的治療規則。

1. 當加上另一種長效支氣管擴張劑仍然無法有效改善病人呼吸困難症狀，建議可以改回單一種支氣管擴張劑即可。
2. 當病人使用 LABA+ICS 後仍有呼吸困難症狀，可以考慮加上 LAMA 來治療。但如果評估病人使用 ICS 的原因並不適當，或對 ICS 反應不佳，或有 ICS 相關的副作用，則建議改用 LABA+LAMA 來治療這一類病人。
3. 如果呼吸困難症狀持續，無論病人是哪一族群，都需找尋其他（非肺阻塞）可能引起呼吸困難的原因。吸入器技巧與醫囑性亦需再次評估。
4. 若病人使用單一支氣管擴張劑（LABA 或 LAMA）治療但仍持續發生急性惡化，可以使用 LABA+LAMA 來治療。若病人合併氣喘或血液中嗜酸性球≥ 300 顆/μL，則可改用 ICS+LABA 來治療。
5. 使用LABA+LAMA 治療但仍持續發生急性惡化的病人，若病人血液中嗜酸性球≥100 顆/μL，可以使用 LAMA+LABA+ICS 來治療。若病人血液中嗜酸性球< 100 顆/μL，則可以考慮加上 roflumilast 或macrolide 來治療。
6. 若病人使用 LAMA+LABA+ICS 治療但仍持續急性惡化，FEV_1 < 50%且合併慢性支氣管炎，可以考慮加上 roflumilast。已戒菸病人，可以考慮加上 macrolide 來治療。在適當評估後（如有ICS 相關副作用），也可以考慮停用ICS。

圖 2-2 肺阻塞追蹤治療建議流程



★血液嗜酸性白血球≥300或≥100且急性發作次數≥2次或住院次數≥1次

★★若肺炎、無適當ICS適應症或對ICS效果不佳，可考慮拿掉ICS或換成複方長效支氣管擴張劑

第二節 非藥物治療

穩定期肺阻塞病人除藥物治療外尚有許多重要的非藥物治療方式。

1. 戒菸
2. 疫苗注射
3. 營養照顧
4. 肺復原、運動訓練、呼吸訓練
5. 居家氧氣治療和呼吸器治療
6. 手術治療
7. 病人教育
8. 疾病管理

一、 戒菸

- 所有吸菸的肺阻塞病人，無論其疾病嚴重度為何，均強烈建議戒菸。
- 尼古丁替代治療（尼古丁口香糖、吸入劑、鼻噴劑、皮膚貼片、舌下錠或口服錠劑）能增加戒菸成功率。Varenicline、bupropion 和 nortriptyline 可增加戒菸率，但僅適合當作支持性介入治療方法之一，不應該單獨使用。
- 不建議使用新型加熱式菸品及電子菸來幫助戒菸。

二、 疫苗注射

- 建議所有肺阻塞病人應每年施打流感疫苗。
- 肺阻塞病人應施打肺炎鏈球菌疫苗。
  - 所有65 歲以上的肺阻塞病人，建議應施打PCV13 或PPV23 兩種肺炎鏈球菌疫苗。
  - 65 歲以下的肺阻塞病人，亦建議先施打肺炎鏈球菌疫苗PCV13。
- 台灣核准上市之肺炎鏈球菌疫苗有二大類，分別為結合型疫苗（pneumococcal conjugate vaccine, PCV）及多醣體疫苗（pneumococcal polysaccharide vaccine, PPV 或 PPSV）皆屬不活化疫苗，可與其他疫苗分開不同部位同時接種。

三、 營養照顧

- 在肺阻塞病人，體重過輕(BMI < 20 kg/m^2) 和體脂肪含量低會導致病人預後較差。
- 給予肺阻塞病人營養補充，可顯著增加其體重，對於呼吸肌強度和整體健康相關生活品質也都有顯著的改善。
- 建議肺阻塞病人宜少量多餐，以避免餐後腹脹導致呼吸困難。
- 對於穩定期肺阻塞病人給予低碳水化合物、高脂肪的飲食配方並未有特別效果。

四、 肺復原

- 肺復原可改善運動能力，減少呼吸短促之感覺，改善生活品質，減少住院次數及住院日數，減少焦慮及憂鬱，改善肺阻塞急性惡化住院後的康復、改善存活率，亦可加強長效 支氣管擴張劑的療效。
- 建議肺復原的訓練包含上下肢肌力及耐受訓練。
- 肺阻塞急性惡化出院後48 小時至4 週內安排肺復原，可有效降低再住院率與死亡率。
- 有效的肺復原計畫至少需持續六至八週，理想的肺復原時間尚未有定論。

五、 運動訓練

- 可藉由腳踏車運動訓練或跑步機行走運動來量測心肺功能之各種生理參數，包括最大耗氧量、最大心跳數及最大作工量來評估病人之運動耐受力。
- 較簡單的方式是使用自我步測的計時行走測試例如 6 分鐘行走測試(6 minutes walking test)；或來回行走測試（shuttle walking test），評估病人在活動時的呼吸困難與血氧飽和度狀態。

六、 呼吸訓練

- 正確的呼吸方式可避免動態過度充氣、改善呼吸困難與活動力。
- 需教導病人正確呼吸方法，例如:

1. 噘嘴式呼吸：利用鼻子吸氣，將嘴巴噘成圓形緩慢將氣吐出來
2. 腹式呼吸：橫隔帶動呼吸，吸氣時應使病人腹部鼓起，吐氣時使腹部凹下

七、 氧氣治療

- 慢性呼吸衰竭、休息時嚴重低血氧之肺阻塞病人，長期氧氣治療（每天大於 15 小時）可以改善其存活率。
- 長期氧氣治療的適應症包含：

1. 休息時$PaO_2 \leq 55$ mmHg 或$SaO_2 \leq 88\%$ 。
2. 休息時PaO_2 介於56-59 mmHg 或SaO_2 介於88-90%，合併有肺動脈高壓、心臟衰 竭合併肢體水腫、紅血球過多症（血比容大於55%）。

八、 呼吸器治療

- 肺阻塞病人在急性惡化期合併急性呼吸衰竭使用非侵襲性呼吸器(NIPPV) 可以減少氣管內管插管機率、縮短住院天數、以及降低住院中死亡率。
- 對於穩定期肺阻塞併高二氧化碳血症的病人不建議常規使用NIPPV。但在極重度病人經審慎評估其優缺點與可行性後可考慮採用NIPPV治療。

九、 手術

- 常用於治療肺阻塞病人的手術包括肺氣泡切除術、肺容積縮減手術、肺臟移植以及支氣管鏡肺容積縮減手術。
- 手術的選擇須考量手術的安全性、手術效益、病人接受度、共病症、手術前後可行的附帶醫療如復健等。

第三節 監測與追蹤

一、 例行性監測與追蹤

- 例行性追蹤對於穩定期肺阻塞病人十分重要，應定期監測下列幾個面向：
  1. 疾病進程及併發症：病人的症狀及肺功能。
  2. 藥物或非藥物治療：治療方法、順從性、療效及併發症。
  3. 急性發作病史：急性惡化的頻率、嚴重性以及可能成因。
  4. 常見共病症：心血管疾病（如高血壓、缺血性心臟病、心臟衰竭、心房纖維震顫）、代謝症候群（如糖尿病和肥胖）、骨質疏鬆、焦慮與憂鬱、感染症、肺癌及支氣管擴張症等。

- 肺阻塞病人追蹤評估之頻率和項目視其疾病嚴重程度而有所不同，建議如下表：

	GOLD 1-3($FEV_1 \geq 30\%$ 預測值)	GOLD 4($FEV_1 < 30\%$ 預測值)
評估頻率	至少每年一次	至少每半年一次
臨床評估	• 吸菸情形及戒菸意願 • 症狀控制是否良好：喘、運動耐受度、急性發作風險 • 併發症和共病症 • 吸入型藥物之使用技巧 • 藥物遵囑性 • 藥物副作用 • 營養狀態評估 • 是否需肺復原	• 吸菸情形及戒菸意願 • 症狀控制是否良好：喘、運動耐受度、急性發作風險 • 併發症和共病症 • 吸入型藥物之使用技巧 • 藥物遵囑性 • 藥物副作用 • 營養狀態評估 • 是否需肺復原 • 是否需氧氣治療 • 是否需其他的介入性治療（如非侵襲性陽壓呼吸器、手術等）
測量	• 肺功能 (FEV_1 及 FVC) • 身體質量指數 (BMI) • 症狀評估量表 (mMRC 或 CAT)	• 肺功能（FEV_1 和 FVC) • 身體質量指數 (BMI) • 症狀評估量表 (mMRC 或 CAT) • 血氧飽和度 (SpO_2)

二、 緩和與安寧療護

- 肺阻塞疾病末期時的生活品質極差，甚至可能進展至慢性呼吸衰竭，必須依賴呼吸器才能維生，此時病人應思考並決定自己未來是否要接受此類維生醫療。
- 末期肺阻塞病人緩和及安寧療護諮詢介入的時機建議如下：

1. 肺阻塞症狀未能獲得改善
2. 嚴重肺功能退化
3. 嚴重日常功能退化
4. 有其他嚴重共病症
5. 每年急性惡化住院大於或等於2 次
6. 曾因惡化導致呼吸衰竭
7. 居家氧氣使用
8. 使用非侵襲性陽壓呼吸器

三、自我處置計畫

- 肺阻塞病人的臨床照護上可加入自我處置的策略，引導病人在疾病的治療過程中扮演更重要的角色。
- 自我處置計劃應著重於加強病人自身主動積極的角色及責任感：

1. 加強病人對肺阻塞症狀的監控
2. 教育病人解決問題的能力，包括症狀增加時該如何處置、如何辨別及處理急性惡化
3. 鼓勵及協助病人戒菸
4. 加強病人對藥物治療的遵囑性
5. 加強身體活動及適度的運動
6. 改善營養狀況

第三章惡化期慢性阻塞性肺病的治療與處理

第一節 急性惡化的定義

	GOLD guideline 2022
COPD急性惡化	病人的呼吸道症狀出現急性變壞，而且超過了平日之間的常態變化，進而導致藥物治療的改變即為急性惡化
* 輕度	惡化時的症狀或症候可以靠調整平常使用的藥物（例如：增加吸入型短效乙二型交感神經作用劑的使用）來改善
* 中度	惡化時的症狀須要使用全身性類固醇或(及)抗生素才能獲得改善
* 重度	病人需要住院治療才能獲得症狀或症候的改善，有機會進展成呼吸衰竭(病人如果在急診室治療超過24小時視為住院)

* 急性惡化會造成病人生活品質下降；影響症狀及肺功能，需要數週方能恢復；並且會加速肺功能下降；提高住院風險及死亡率。

第二節 急性惡化的評估

所有重度急性惡化的住院病人，都應該要根據病人的臨床狀況來做評估，GOLD guideline 2022建議分成以下三種:

	呼吸速率	**使用呼吸輔助肌**	**意識狀態**	**氧氣治療**	**血中二氧化碳**
無呼吸衰竭	20-30次/分	無	無改變	24-35%	無上升
呼吸衰竭"**非**"危及生命	超過30次/分	有	無改變	35-40%	超過平常值或50-60 mmHg
呼吸衰竭危及生命	超過30次/分	有	改變	>40%	超過60 mmHg或合併酸中毒

(一)、急性發作的主要根據為何?急性惡化的鑑別診斷為何?

	臨床建議內容
急性惡化的依據	肺阻塞急性惡化與否完全依賴症狀的急性變化，當病人的臨床表現與平時不同、呼吸道發炎加劇，會造成呼吸困難變嚴重、痰量增加或變濃稠、咳嗽、呼吸帶有哮喘聲。
誘發因子	根據研究，肺阻塞惡化的原因約三分之二為呼吸道感染及空氣污染所致，常見誘發因子為病毒/細菌感染、空氣污染（包含空汙、抽煙/二手菸）情緒變化、自行停藥。其餘三分之一導致惡化的原因則難以確定。
其他需排除因素	需排除心臟衰竭、心律不整、肺栓塞、急性冠狀動脈症候群、氣胸、肺炎、肺塌陷等其他臨床症狀相似疾病。

(二)、急性惡化的臨床常規檢驗檢查

1. 中重度急性發作（急診或者住院必要檢查/檢驗項目）：

必要項目	
檢驗項目	**臨床建議內容**
CBC/DC	(1) 急性發作原因的區分：鑑別診斷感染(白血球增多 leukocytosis)或其他因素，同時評估是否有貧血/腸胃道出血/紅血球增生症（polycythemia）、 (2) 其中嗜酸性球之高低可能可以作為全身性類固醇治療選擇之參考。
生化：肝腎功能	(1) 用藥需要基礎肝腎功能做調整。 (2) 排除共病症相關症狀以及整體狀況評估。
CXR	肺阻塞急性惡化時，可以使用胸腔 X 光檢查來排除肺阻塞以外之胸部顯著疾病。
ABG	中重度急性發作需評估呼吸器及氧氣介入時機點。
心電圖 Troponin-I	(1) 需排除心臟衰竭、肺栓塞、急性冠狀動脈症候群等其他心血管疾病臨床症狀相似疾病。 (2) 心血管疾病是 COPD 常見共病症，COPD 族群也是心血管疾病的高危險族群
痰液/血液細菌培養	肺阻塞急性惡化懷疑有感染時，可以執行痰液細菌培養作為抗生素用藥參考。

2. 中重度急性發作建議選項（急診或者住院建議檢查/檢驗項目）：

	建議選項
檢驗項目	**臨床建議內容**
問卷	(1) CAT 及 CCQ 問卷可以用作評估肺阻塞急性惡化的風險。 (2) 根據臨床研究，當 CAT score 增加超過 4 分時與病患將來的健康狀態惡化有很好的相關性。
肺功能 (spirometry)	肺阻塞急性惡化期肺功能檢查執行困難，並且可能不準確，建議不常規執行。
肺栓塞掃描 (lung perfusion scan)	根據Meta-analysis, 臨床上 COPD AE 的患者約有16.1%是與 pulmonary embolism有關，對於有活動性喘限制活動、肥胖、下肢不對稱的水腫以及無法解釋喘的患者需要提高警覺。若患者有急性的右心衰竭或者三尖瓣逆流，更應該積極考慮pulmonary embolism的可能性。
BNP or pro-BNP	評估是否有心臟衰竭的共病症。
Procalcitonin	Procalcitonin 可以考慮作為在肺阻塞急性惡化時需要使用抗生素與否的指標
2D echo	評估心臟功能以及心臟衰竭的共病症時可考慮。
CT	胸腔斷層掃描（Chest CT scan）不應作為肺阻塞患者常規檢查。
生物指標	建議不使用生物標記做為急性惡化之診斷

第三節　　急性惡化的治療

肺阻塞急性惡化的治療目標為改善症狀及減少併發症。大多數急性惡化的病人都可於門診透過藥物的調整獲得適當的治療，然而當急性惡化較嚴重時，就需要進一步的評估，決定此次急性惡化是否危及生命，以及換氣功能是否受到影響需要接受侵襲性/非侵襲性呼吸器支持。

1. 住院適應症

(1) 症狀嚴重，例如突然惡化的休息時呼吸困難、呼吸速率過快、血氧飽和度降低、意識不清
(2) 急性呼吸衰竭
(3) 新出現的身體變化，例如紫紺(Cyanosis)、四肢水腫
(4) 於診所或急診初步處置後急性惡化仍未改善
(5) 具有嚴重的共病症，例如心臟衰竭、新發生的心律不整
(6) 社區及家庭無法提供足夠的醫療資源

2. 急性惡化的藥物治療建議：(Reference from GOLD guideline 2022)

藥物	臨床建議內容
全身性類固醇 (Evidence A)	(1) 肺阻塞急性惡化時建議使用全身性類固醇，可縮短恢復時間，改善肺功能及低血氧血症並降低早期復發、治療失敗及長期住院治療的風險。 (2) 低劑量的全身性類固醇0.5mg/Kg prednisolone(每日總量約30-40mg)使用5-7天，即可改善肺阻塞的急性惡化。
抗生素 (Evidence B)	(1) 病人同時出現呼吸困難、痰量增加、膿痰增加，建議使用抗生素。 (2) 若需要使用呼吸器 (侵襲性或非侵襲性) 亦應開立抗生素。 (3) 可縮短恢復時間，降低早期復發、治療失敗及長期住院治療的風險。 (4) 抗生素的選擇應根據當地抗藥性菌株的型態而定，根據國內的研究指出，因為肺阻塞急性惡化而導致住院的菌種分布，第一名為克雷伯氏肺炎桿菌 17.2%，第二名為綠膿桿菌11.8% 第三名才是流行性嗜血桿菌 8.6%。 (5) 目前根據國內肺阻塞指引建議初始的經驗性治療為胺基青黴素類 (aminopenicillin) 亦可併用克拉維酸 (clavulanic acid)、macrolide 或四環黴素 (tetracycline)。 (6) 頻繁急性惡化、嚴重呼氣氣流受阻與 / 或急性惡化而需呼吸器的病人，則須根據過去醫院內部常見菌種而有所調整 (7) 在痰液培養藥敏試驗報告未出來前，建議先使用經驗性廣效性抗生素，日後再根據藥敏試驗結果更改抗生素使用。
SABA (Evidence C)	(1) 短效吸入型乙二型交感神經刺激劑(SABA) (或與短效抗膽鹼藥物合併使用) 可以用於治療肺阻塞急性惡化。 (2) 使用定量噴霧吸入器 (無論有無使用吸入輔助器) 或霧化液型所得到的 FEV_1 改善差異不大，不過後者對於重病患者使用較為便利。
Methylxanthines (Evidence B)	不建議使用Methylxanthine類藥物(例如Theophylline)，因為會增加藥物副作用。

2. 急性惡化的非藥物治療建議：(Reference from GOLD guideline 2022)

	臨床建議內容
氧氣	(1) 針對肺阻塞急性惡化的病人，當血氧飽和度低於 88%時，建議使用氧氣治療 (2) 氧氣治療的目標希望能使得血氧飽和度維持在90-92%。同時建議在氧氣治療後 30 至 60 分鐘後建議需進行動脈血液氣體分析，以確保氧合程度，避免二氧化碳滯留導致呼吸性酸中毒。 (3) 使用氧氣治療可以使得低血氧改善，讓呼吸症狀變好，使心臟血管功能不會受到影響，進一步使得死亡率減少。
經鼻高流量氧氣治療(HFNC)	經鼻高流量氧氣治療可以考慮作為肺阻塞急性惡化治療的選項，可以改善高碳酸血症，但對死亡率無顯著影響。
非侵襲性陽壓呼吸器(例如BiPAP)	(1) 肺阻塞急性惡化的病人如果併有呼吸衰竭，應優先考慮使用非侵襲性陽壓呼吸器，可以使呼吸肌肉的疲乏得到改善、減少住院治療天數、降低急性發作導致的插管(可減少80-85%的插管比率)與死亡率。 (2) 適應症: A. 呼吸性酸中毒(PaCO2>45 mmHg且pH≤7.35)。 B. 呼吸肌疲乏、呼吸功上升導致嚴重的呼吸困難(例如使用呼吸輔助肌、反常呼吸paradoxical respiration、肋間凹陷)。 C. 使用氧氣治療後持續低血氧。 (3) 若拔管後有失敗的徵兆的病人，且無相關禁忌症，建議可以考慮先使用非侵襲性陽壓呼吸器來協助脫離呼吸器，此種方式可以預防再次插管，並降低死亡率 (4) 非侵襲性陽壓呼吸器治療的禁忌症: A. 心跳停止。 B. 血液動力學不穩定。 C. 伴隨嗆咳的高風險。 D. 意識狀態不佳，無法配合的病人。 E. 近期接受顏面手術的病人。 F. 痰液過多或是過黏稠的病人。
侵襲性呼吸器	(1) 當肺阻塞的病人出現下列情況時，建議使用侵襲性呼吸器來治療肺阻塞急性發作。 (2) 適應症: A. 非侵襲性陽壓呼吸器無法使用或治療失敗。 B. 呼吸停止或心跳停止。 C. 失去意識或喘不過氣而呼吸暫停。 D. 意識改變，或鎮靜劑無法有效控制的躁動（psychomotor agitation）。 E. 呼吸道嗆入大量異物（massive aspiration）。 F. 無法有效清除呼吸道分泌物。 G. 心跳數小於每分鐘 50 下且有意識障礙。 H. 嚴重血行動力學不穩，對於液體和升壓藥無反應。 I. 嚴重心律不整。 J. 危急生命的低血氧血症，且無法忍受非侵襲性陽壓呼吸器。 (3) 使用侵襲性呼吸器而並不會導致死亡率增加，研究顯示肺阻塞病人合併呼吸衰竭的院內死亡率為 17-49%
肺復健治療	(1) 肺復原治療可以縮短住院天數，減少因為急性惡化而導致死亡的比例，同時使得下一次因為急性惡化而需要再 住院的比例下降。 (2) 出院後儘可能於 48 小時內接受肺復原治療，包括肌肉的伸展以及中到高強度的運動訓練，比起住院當下立即接受治療的病人，較能使得下一次因為急 性惡化而需要再住院的比例下降。

第四節 急性惡化的出院與出院後監測

1. 肺阻塞急性惡化病人的出院，出院後的的門診建議評估的項目

出院前準備

- 完整評估臨床狀況及檢驗報告。
- 確保病人或居家照顧者已完全了解正確的用藥方法。
- 提供共病症的處置計劃及追蹤。
- 評估是否需長期使用氧氣。
- 衛教急性發作時的處理方式。
- 已安排好追蹤治療(早期追蹤4週內、晚期追蹤12週內)。

早期追蹤(4周內)

- 確定有效的居家藥物維持治療。
- 重新評估吸入器的使用技巧。
- 給予衛教使其維持性治療的角色。
- 若有開立的話，指示病人完成類固醇及抗生素治療。
- 評估病人是否需要長期氧氣治療。
- 症狀評估: CAT 或 mMRC。
- 共病症的評估。
- 評估身體活動性及肺復原計畫。

晚期追蹤(12週內)

- 能否適應日常環境。
- 測量FEV_1。
- 再度評估吸入器的使用技巧。
- 瞭解使用中的藥物。
- 評估病人是否需要長期氧氣治療或家中使用霧化液。
- 能進行身體運動及日常活動的能力。
- 症狀評估: CAT 或 mMRC。
- 共病症的評估。

2. 肺阻塞急性惡化病人住院及出院後因急性惡化再度住院的危險因子

研究結果亦顯示有多個因子，包括前一年內大於或等於3次因肺阻塞 急性惡化住院、較差的肺功能、較低的動脈血氧分壓、長期氧氣治療、呼吸喘促、口服類固醇的使用、健康狀態 較差，可用來預測肺阻塞急性惡化病人出院後因急性惡化再度住院的風險，其中，又以日常 身體活動此一預測因子最重要。綜合言之，肺阻塞病人應增加日常身體活動，以降低因肺阻 塞 急性惡化病人住院及再住院的風險。

3. 降低肺阻塞急性惡化的方式

支氣管擴張劑	LAMA, LABA, LAMA+LABA
吸入型類固醇	LABA+ICS, LABA+LAMA+ICS
抗發炎藥物(非類固醇)	Roflumilast
降低感染	疫苗 長期使用Macrolides
改善呼吸道分泌物	N-acetylcysteine Carbocysteine Erdosteine
其他	戒菸 肺復健 肺減除手術 維生素D 戴口罩、勤洗手、保持社交距離

4. 急性惡化的其他照顧模式?

建議對於經常惡化、生活品質不良、運動能力下降及症狀頻繁之病人施行肺阻塞整合型照護計劃。

整合型照護計畫必需至少包含二種以上不同職類的醫療專業人員，提供二種以上不同的整合性照護流程 (例如營養、運動及自我照護)，並持續三個月以上。

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