

Table S1 Characteristics of including studies in this meta-analysis

Study	Publication year	Study design	Centers	Study period	Location of study	Characteristics ^a	Patients with COVID-19	Patients with CAPA	Death	Incidence	Mortality	CFR
Alanio A, <i>et al.</i>	2020	Prospective cohort study	Single center	NR	France	MV	27	9	4	0.333	0.148	0.444
Buehler PK, <i>et al.</i>	2021	Prospective cohort study	Single center	April to June 2020	Switzerland	ARDS	45	5	3	0.111	0.067	0.600
Helleberg M, <i>et al.</i>	2021	Retrospective cohort study	Single center	March 15 to November 4 2020	Denmark	ECMO	8	2	2	0.250	0.250	1.000
van Arkel ALE, <i>et al.</i>	2020	Retrospective cohort study	Single center	NR	Netherlands	MV	31	6	4	0.194	0.190	0.667
Van Biesen S, <i>et al.</i>	2020	Retrospective cohort study	Single center	3-week time frame in April 2020	Netherlands	MV	42	9	2	0.214	0.048	0.222
Bartoletti M, <i>et al.</i>	2021	Prospective cohort study	Multi-center	February 22 to April 20 2020	Italy	ARDS	108	30	13	0.278	0.120	0.433
Borman AM, <i>et al.</i>	2021	Retrospective cohort study	Single center	March 11 to July 14, 2020	UK	Others	61	13	NR	0.213	NR	NR
Bretagne S, <i>et al.</i>	2021	Retrospective cohort study	Multi-center	1 February to 31 May, 2020	France	Others	NR	154	71	NR	NR	0.461
Chauvet P, <i>et al.</i>	2020	Retrospective cohort study	Single center	March 24 to May 25, 2020	France	ARDS	46	6	4	0.130	0.087	0.667
Delliere S, <i>et al.</i>	2021	Retrospective cohort	Multi-center	March 15 to May 1, 2020	France	Others	108	21	15	0.194	0.139	0.714
Dupont D, <i>et al.</i>	2021	Retrospective cohort study	Single center	NR	France	ARDS	106	19	7	0.179	0.066	0.368
Fekkar A, <i>et al.</i>	2021	Retrospective cohort study	Single center	March 6 to April 24, 2020	France	MV	145	7	4	0.048	0.028	0.571
Gangneux JP, <i>et al.</i>	2020	Prospective cohort study	Single center	NR	France	ARDS	45	7	2	0.156	0.044	0.286
Gouzien L, <i>et al.</i>	2021	Retrospective cohort study	Single center	March 1 to April 30, 2020	France	MV	53	1	0	0.019	0.000	0.000
Janssen NAF, <i>et al.</i>	2021	Retrospective cohort study	Multi-center	April 7 to May 31, 2020	Multinational	Others	823	63	31	0.077	0.038	0.492
Koehler P, <i>et al.</i>	2020	Retrospective cohort study	Single center	March to April, 2020	Germany	ARDS	19	5	3	0.263	0.158	0.600
Lahmer T, <i>et al.</i>	2021	Prospective cohort study	Single center	March to April, 2020	Germany	MV	32	11	4	0.344	0.125	0.364
Lamoth F, <i>et al.</i>	2020	Prospective cohort study	Single center	March 6 to May 11, 2020	Switzerland	MV	80	3	1	0.038	0.013	0.333
Meijer EF, <i>et al.</i>	2021	Prospective cohort study	Single center	March-May 2020; mid-September to mid-December 2020	Netherlands	MV	66	13	6	0.197	0.091	0.462
Mitaka H, <i>et al.</i>	2020	Retrospective cohort study	Single center	March 21 to April 22, 2020	New York, USA	MV	7	4	4	0.571	0.571	1.000
Nasir N, <i>et al.</i>	2020	Retrospective cohort study	Single center	February to April, 2020	Pakistan	ARDS	23	5	3	0.217	0.130	0.600
Nebreda-Mayoral T, <i>et al.</i>	2020	Retrospective cohort study	Single center	March 1 to May 31, 2020	Spain	MV	50	3	1	0.060	0.020	0.333
Paramythiotou E, <i>et al.</i>	2021	Retrospective cohort study	Single center	22 March, 2020 and 28 February, 2021	Greek	Others	179	6	4	0.034	0.022	0.667
Prattes J, <i>et al.</i>	2021	Retrospective cohort study	Multi-center	NR	Multinational	Others	592	109	62	0.184	0.105	0.569
Razazi K, <i>et al.</i>	2020	Retrospective cohort study	Single center	October 1, 2009 to April 29, 2020	France	ARDS	90	19	NR	0.211	NR	NR
Roman-Montes CM, <i>et al.</i>	2021	Retrospective cohort study	Single center	April 13 to June 1, 2020	Mexico	MV	144	14	8	0.097	0.056	0.571
Rutsaert L, <i>et al.</i>	2020	Retrospective cohort study	Single center	March 12 to April 25, 2020	Belgium	MV	20	7	4	0.350	0.200	0.571
Segrelles-Calvo G, <i>et al.</i>	2021	Prospective cohort study	Single center	February 1 to April 30, 2020	Spain	Others	215	7	5	0.033	0.023	0.714
van Grootveld R, <i>et al.</i>	2021	Prospective cohort study	Single center	April 1 to May 11, 2020	Netherlands	MV	63	11	7	0.175	0.111	0.636
Wang J, <i>et al.</i>	2020	Retrospective cohort study	Single center	January to March, 2020	China	Others	78	8	NR	0.103	NR	NR
White PL, <i>et al.</i>	2021	Prospective cohort	Multi-center	NR	UK	MV	135	19	13	0.141	0.081	0.579

^a, the category of the patients; others: mixed patients with COVID-19. CAPA, COVID-19-associated pulmonary aspergillosis; CFR, case fatality rate; MV, mechanical ventilation; ARDS, acute respiratory distress syndrome.

Table S2 Quality of all included studies using the Newcastle-Ottawa Scale (NOS)

Study	Publication Year	NOS Score	Selection				Comparability		Outcome	
			Representativeness of the exposed cohort	Selection of the non-exposed cohort	Ascertainment of exposure	Outcome of interest was not present at start of study	Comparability of cohorts	Assessment of outcome	Follow-up long enough	Adequacy of follow-up
Alanio A, <i>et al.</i>	2020	☆☆☆☆ ☆☆☆☆☆	☆	☆	☆	☆	☆☆	☆	☆	☆
Rutsaert L, <i>et al.</i>	2020	☆☆☆☆ ☆☆☆☆	☆	☆	☆	☆	☆	☆	☆	☆
Koehler P, <i>et al.</i>	2020	☆☆☆☆ ☆☆☆☆	☆	☆	☆	☆	☆	☆	☆	☆
Nasir N, <i>et al.</i>	2020	☆☆☆☆ ☆☆☆☆	☆	☆	☆	☆	☆	☆	☆	☆
Van Biesen S, <i>et al.</i>	2020	☆☆☆☆☆ ☆☆☆☆☆	☆	☆	☆	☆	☆☆	☆	☆	☆
Bartoletti M, <i>et al.</i>	2021	☆☆☆☆ ☆☆☆☆☆	☆	☆	☆	☆	☆☆	☆	☆	☆
Lamoth F, <i>et al.</i>	2020	☆☆☆☆ ☆☆☆☆	☆	☆	☆	☆	☆	☆	☆	☆
Nebreda-Mayoral T, <i>et al.</i>	2020	☆☆☆☆ ☆☆☆☆	☆	☆	☆	☆	☆	☆	☆	☆
Lahmer T, <i>et al.</i>	2021	☆☆☆☆ ☆☆☆☆☆	☆	☆	☆	☆	☆☆	☆	☆	☆
RazaziK, <i>et al.</i>	2020	☆☆☆☆ ☆☆☆☆☆	☆	☆	☆	☆	☆☆	☆	☆	☆
Chauvet P, <i>et al.</i>	2020	☆☆☆☆ ☆☆☆☆	☆	☆	☆	☆	☆	☆	☆	☆
Fekkar A, <i>et al.</i>	2021	☆☆☆☆ ☆☆☆☆☆	☆	☆	☆	☆	☆☆	☆	☆	☆
Mitaka H, <i>et al.</i>	2020	☆☆☆☆ ☆☆☆☆	☆	☆	☆	☆	☆	☆	☆	☆
Dupont D, <i>et al.</i>	2021	☆☆☆☆ ☆☆☆☆	☆	☆	☆	☆	☆	☆	☆	☆
Segrelles-Calvo G, <i>et al.</i>	2021	☆☆☆☆ ☆☆☆☆	☆	☆	☆	☆	☆	☆	☆	☆
Helleberg M, <i>et al.</i>	2021	☆☆☆☆ ☆☆☆☆	☆	☆	☆	☆	☆	☆	☆	☆
van Arkel ALE, <i>et al.</i>	2020	☆☆☆☆ ☆☆☆☆☆	☆	☆	☆	☆	☆☆	☆	☆	☆
Meijer EF, <i>et al.</i>	2021	☆☆☆☆ ☆☆☆☆☆	☆	☆	☆	☆	☆☆	☆	☆	☆
Gangneux JP, <i>et al.</i>	2020	☆☆☆☆ ☆☆☆	☆	☆	☆	☆	☆	☆	☆	☆
van Grootveld R, <i>et al.</i>	2021	☆☆☆☆ ☆☆☆☆	☆	☆	☆	☆	☆	☆	☆	☆
Buehler PK, <i>et al.</i>	2021	☆☆☆☆ ☆☆☆☆	☆	☆	☆	☆	☆	☆	☆	☆
Wang J, <i>et al.</i>	2020	☆☆☆☆ ☆☆☆	☆	☆	☆	☆	☆☆	☆	☆	☆
Roman-Montes CM, <i>et al.</i>	2021	☆☆☆☆ ☆☆☆☆	☆	☆	☆	☆	☆	☆	☆	☆
White PL, <i>et al.</i>	2021	☆☆☆☆ ☆☆☆☆	☆	☆	☆	☆	☆	☆	☆	☆
Delliere S, <i>et al.</i>	2021	☆☆☆☆ ☆☆☆☆☆	☆	☆	☆	☆	☆☆	☆	☆	☆
Gouzien L, <i>et al.</i>	2021	☆☆☆☆ ☆☆☆	☆	☆	☆	☆	☆	☆	☆	☆
Bretagne S, <i>et al.</i>	2021	☆☆☆ ☆☆☆	☆	☆	☆	☆	☆	☆	☆	☆
Janssen NAF, <i>et al.</i>	2021	☆☆☆☆ ☆☆☆☆☆	☆	☆	☆	☆	☆☆	☆	☆	☆
Prattes J, <i>et al.</i>	2021	☆☆☆☆ ☆☆☆☆☆	☆	☆	☆	☆	☆☆	☆	☆	☆
Paramythiotou E, <i>et al.</i>	2021	☆☆☆☆ ☆☆☆☆☆	☆	☆	☆	☆	☆☆	☆	☆	☆
Borman AM, <i>et al.</i>	2021	☆☆☆☆☆	☆	☆	☆	☆	☆			

Table S3 Definition of COVID-19-associated pulmonary aspergillosis (CAPA) in the eligible studies

Author	Publication Year	Clinical	Radiological	Microbiological
RazaziK, <i>et al.</i>	2020	IAPA case definition, and modified AspICU definition		
van Grootveld R, <i>et al.</i>	2021	ECMM/ISHAM consensus criteria		
White PL, <i>et al.</i>	2021	PCR confirmed COVID-19 infection and one of: Refractory fever despite at least 3 days antibiotics recrudescence fever of at least 48 hours despite antibiotics dyspnoea haemoptysis pleural rub or chest pain worsening respiratory function despite antibiotics and ventilatory support	New infiltrates on chest X-ray or chest CT when compared to admission, including progression of signs attributed to viral infection. Radiological signs typical of invasive pulmonary aspergillosis (nodules, halos, cavities, wedge-shaped and segmental or lobar consolidation) or evidence of sinusitis should be associated with heightened suspicion of fungal disease	Proven: histology/microscopy demonstrating dichotomous septate hyphae in tissue positive culture from tissue Putative: non-specific radiology: two or more positives across different test types, or multiple positives within one test type, from the following: positive culture from NBL/BAL, positive GM-EIA in NBL/BAL (I ≥1.0), positive GM-EIA in serum (I ≥0.5), positive Aspergillus PCR in BAL or blood, positive 1-3-β-D-Glucan in serum/plasma Radiology typical of IA: one positive mycological test as listed above, unless the typical radiological signs can be attributed to a different underlying infection (e.g., lung cancer or alternative infection). In this scenario multiple positive results would be required to attain a diagnosis of putative IPA Please note: given the aetiological diversity associated with sinusitis, multiple positive tests from the list above are required to attain a diagnosis of putative IPA
Buehler PK, <i>et al.</i>	2021	IDSA Practice Guidelines for the Diagnosis and Management of Aspergillosis (2016)		
Wang J, <i>et al.</i>	2020	EORTC/MSGERC consensus criteria		
Borman AM, <i>et al.</i>	2021	The modified AspICU criteria		
Rutsaert L, <i>et al.</i>	2020	AspICU algorithm, the EORTC criteria		
Koehler P, <i>et al.</i>	2020	The modified AspICU criteria		
Nasir N, <i>et al.</i>	2020	Clinical signs and symptoms, lung imaging, respiratory specimen culture (bronchoalveolar lavage (BAL), tracheal aspirate or sputum) positive for Aspergillus spp. or a positive serum or lower respiratory samples galactomannan index of more than 0.5 and 1.0 respectively in patients who were either not improving from COVID-19 or who worsened after transient improvement of symptoms from COVID-19		
Van Biesen S, <i>et al.</i>	2020	The modified AspICU criteria		
Bartoletti M, <i>et al.</i>	2021	IAPA case definition		
Lamoth F, <i>et al.</i>	2020	IAPA case definition		
Nebreda-Mayoral T, <i>et al.</i>	2020	Not clearly described		
Lahmer T, <i>et al.</i>	2021	The modified AspICU criteria		
Chauvet P, <i>et al.</i>	2020	AspICU criteria, EORTC-MSG criteria		
Fekkar A, <i>et al.</i>	2021	Not clearly described		
Mitaka H, <i>et al.</i>	2020	The modified AspICU criteria		
Dupont D, <i>et al.</i>	2021	The modified AspICU criteria		
Alanio A, <i>et al.</i>	2020	EORTC-MSG criteria (if immunocompromised) or the IAPA criteria combined with serum β-D-glucan and quantitative real-time PCR (qPCR)		
Segrelles-Calvo G, <i>et al.</i>	2021	EORTC/MSG criteria		
Helleberg M, <i>et al.</i>	2021	The modified AspICU criteria		
van Arkel ALE, <i>et al.</i>	2020	IAPA case definition		
Meijer EF, <i>et al.</i>	2021	ECMM/ISHAM consensus criteria		
Gouzien L, <i>et al.</i>	2021	AspICU algorithm, the EORTC criteria, the expert consensus case criteria for IAPA, and Alanio's definition		
Delliere S, <i>et al.</i>	2021	EORTC/MSGERC consensus criteria in immunocompromised patients and according to the consensus case definition proposal for influenza-/COVID-19-associated pulmonary aspergillosis (CAPA) in ICU patients		
Bretagne S, <i>et al.</i>	2021	EORTC/MSGERC consensus criteria		
Janssen NAF, <i>et al.</i>	2021	ECMM/ISHAM consensus criteria		
Prattes J, <i>et al.</i>	2021	ECMM/ISHAM consensus criteria		
Gangneux JP, <i>et al.</i>	2020	The modified AspICU criteria		
Roman-Montes CM, <i>et al.</i>	2021	The modified AspICU criteria		
Paramythiotou E, <i>et al.</i>	2021	The modified AspICU and ECMM/ISHAM		

CAPA, COVID-19-associated pulmonary aspergillosis; EORTC, European Organization for Research and Treatment of Cancer; MSGERC, the Mycoses Study Group Education and Research Consortium; IAPA, influenza-associated pulmonary aspergillosis; BAL, bronchoalveolar lavage; qPCR, quantitative real-time PCR; ECMM, European Confederation of Medical Mycology; ISHAM, the International Society for Human and Animal Mycology; IDSA, Infectious Diseases Society of America.