

S3 Table: Classification of the histopathological findings in COVID-19 cases

Organ	Taxonomy	Histopathological findings	Prevalence
Lung	Diffuse Alveolar Damage	<ul style="list-style-type: none"> • DAD any phase (acute, organizing, fibrotic) • Hyaline membranes • Alveolar fibrin plugs • Loss of pneumocytes • Reactive pneumocytes and syncytial cells • Vesicular nuclei with prominent nucleoli • Type 2 pneumocyte hyperplasia • Microthrombi • Increased intra alveolar megakaryocytes 	315
	Coagulopathy associated abnormalities	<ul style="list-style-type: none"> • Microthrombi 	173
	Endothelial injury	<ul style="list-style-type: none"> • Endotheliitis • Endothelial necrosis 	61
	Thromboembolic disease	<ul style="list-style-type: none"> • Medium/large vessel thromboembolism • Pulmonary infarction 	47
	Vasculitis	<ul style="list-style-type: none"> • Vasculitis • Capillaritis • Diffuse alveolar hemorrhage • Alveolar hemorrhage • Pulmonary hemorrhage 	10
	Possible cytopathic effect encompasses	<ul style="list-style-type: none"> • Atypical polymorphous pneumocytes • Apoptotic bodies • Intranuclear inclusions 	21
	Serositis	<ul style="list-style-type: none"> • Acute pleuritis 	1
	Non-specific lung scarring	<ul style="list-style-type: none"> • Proliferation myofibroblastic • Organizing pneumonia pattern • Interstitial fibrosis • Lymphocyte infiltration • Prominent lymphoid infiltrates • Lymphocytes CD4/CD8 • Interstitial T-cell reaction • Angiogenesis/Capillary proliferation • Squamous metaplasia 	103
	Changes due to hemodynamic compromise	<ul style="list-style-type: none"> • Pulmonary capillary congestion • Intra alveolar edema 	27
	Complications	<ul style="list-style-type: none"> • Bacterial pneumonia 	94
		<ul style="list-style-type: none"> • Hemophagocytosis 	1
Upper airways inflammation	Pre-existent or non-significant conditions	<ul style="list-style-type: none"> • Emphysema • Amyloidosis of pulmonary vessels • Mononuclear macrophage 	29
	Inflammation	<ul style="list-style-type: none"> • Pharyngeal hyperemia • Tracheitis • Edema bronchial mucosa 	33
	Possibly pre-existent parenchymal abnormalities encompass	<ul style="list-style-type: none"> • Steatosis = fatty changes = NASH • Cholestasis, ductal proliferation 	93
Liver	Endothelial injury	<ul style="list-style-type: none"> • Endotheliitis 	1
	Thromboembolic disease	<ul style="list-style-type: none"> • Venous outflow obstruction • Post vein phlebosclerosis (portal ?) 	93
		<ul style="list-style-type: none"> • Thrombosis 	

	Possible cytopathic effect encompasses	<ul style="list-style-type: none"> • Apoptotic hepatocytes • Hepatitis: Portal inflammation, periportal and lobular T-cell reaction, Lymphocytic infiltrate, Lobular inflammation, Kupffer cell proliferation 	2 50
	Abnormalities secondary to hemodynamic compromise	<ul style="list-style-type: none"> • Hepatomegaly • Edema/congestion • Shock liver (common perimortem terminal event) • Aberrant portal vessels • Periportal abnormal vessels 	114
	Non-specific scarring	Fibrosis NOS	60
	Pre-existent or non-significant conditions :	Cirrhosis, Gall bladder – enlarged, Liver cyst	10
CARDIOVASCULAR	Endothelial injury	<ul style="list-style-type: none"> • Endotheliitis 	8
	Thromboembolic disease	<ul style="list-style-type: none"> • Thrombosis 	45
	Possible cytopathic effect	<ul style="list-style-type: none"> • Cardiomyocyte necrosis • Apoptotic bodies • Myocarditis (24)- Interstitial infiltration, Lymphocytic and Eosinophilic myocarditis 	37
	Serositis	<ul style="list-style-type: none"> • Epicarditis • Epicardial inflammation • Pericardial edema • Pericardial effusion 	4
	Complications	<ul style="list-style-type: none"> • Cardiomyopathy (if not pre-existent) • Hemophagocytosis 	5
	Pre-existent cardiovascular disease	<ul style="list-style-type: none"> • Myocardial/myocyte hypertrophy • Atherosclerosis • Ischemic cardiomyopathy • MI • Myocardial/interstitial fibrosis • Cardiomegaly 	115
	Pre-existent or non-significant conditions	<ul style="list-style-type: none"> • Amyloidosis 	8
KIDNEY/GENITOURINARY	Endothelial injury	<ul style="list-style-type: none"> • Endotheliitis 	1
	Thromboembolic disease	<ul style="list-style-type: none"> • Artery thrombus • Thromboemboli 	2
	Possible viral effect	<ul style="list-style-type: none"> • Glomerulopathies (if not pre-existent) Includes FSGS, MNS, mesangial expansion 	9
	Abnormalities secondary to hemodynamic compromise	<ul style="list-style-type: none"> • Congestion • Shock kidney • Congestion/medullary edema • Acute tubular injury 	147
	Coagulopathy associated abnormalities	<ul style="list-style-type: none"> • DIC • Capillary thrombus • Segmental fibrin thrombus 	55
	Non-specific scarring	<ul style="list-style-type: none"> • Granular surface/scarring • Cortical fibrosis 	24
	Pre-existent vascular disease	<ul style="list-style-type: none"> • Arterionephrosclerosis • Benign nephrosclerosis 	76
	Pre-existent or non-significant conditions	<ul style="list-style-type: none"> • Cysts • Testicular atrophy • Amyloidosis 	47

		<ul style="list-style-type: none"> • Pigment casts • Glomerulopathies (if present before infection) (FSGS, MNS, mesangial expansion) • Prostate thrombosis • Benign prostatic hyperplasia • Hypospermatogenesis • Mild peritubular hyalinization 	
Central Nervous System	Abnormalities secondary to hemodynamic compromise	<ul style="list-style-type: none"> • Cerebral edema/congestion • Hypoxic injury • Anoxic injury 	34
	Coagulopathy associated abnormalities	<ul style="list-style-type: none"> • Hemorrhage • Microthrombi 	20
	Thromboembolic disease	<ul style="list-style-type: none"> • Infarcts (if recent) 	9
	Inflammation (Possible cytopathic effect)	<ul style="list-style-type: none"> • Leptomeningeal inflammation • Perivascular inflammation • Encephalitis: 5 • Lymphocytic meningitis 	9
	Pre-existent vascular disease:	<ul style="list-style-type: none"> • Cerebral chronic infarcts • Atherosclerosis 	18
	Pre-existent or non-significant conditions	<ul style="list-style-type: none"> • Subdural hematoma • Cerebral cortex atrophy • Pale substantia nigra • Focal spongiosis • Lewy body disease • Alzheimer's disease • Microglial nodule • Neuronal cell loss • Axonal degeneration • Residual anaplastic astrocytoma • Cytolysis 	35
GASTROINTESTINAL	Endothelial injury	<ul style="list-style-type: none"> • Endotheliitis 	2
	Coagulopathy associated abnormalities	<ul style="list-style-type: none"> • Hemorrhage 	3
	Abnormalities secondary to hemodynamic compromise or thromboembolic disease	<ul style="list-style-type: none"> • Mesenteric necrosis • Ischemic enterocolitis • Pancreatitis 	15
	Possible cytopathic effect	<ul style="list-style-type: none"> • Apoptotic bodies 	2
	Pre-existent or non-significant conditions	<ul style="list-style-type: none"> • Esophagitis • Diverticulosis • Chronic gastritis 	2
HEMATOLYMPHOID	Possible cytopathic effect	<ul style="list-style-type: none"> • Increased plasma blasts • Apoptosis 	15
	Abnormalities secondary to hemodynamic compromise	<ul style="list-style-type: none"> • Congestion • Infarction 	7
	Thromboembolic disease	<ul style="list-style-type: none"> • Arteriolar thrombosis 	1
	Non-specific changes secondary to systemic infection	<ul style="list-style-type: none"> • Decreased myelopoiesis • Lymphadenopathy • Splenomegaly • Bone marrow hyperplasia • Left-shifted myelopoiesis • Left-shifted granulopoiesis • Splenitis • Plasma cells in spleen 	41
	Changes likely due to steroid therapy	<ul style="list-style-type: none"> • Lymphoid depletion • Reduced white pulp 	29
	Complications	<ul style="list-style-type: none"> • Hemophagocytosis 	21

SKIN	Endothelial injury	• Endotheliitis	1
	Coagulopathy associated abnormalities	• Petechiae • Dermal necrosis • Dermo-hypodermal/superficial thrombi • Deep dermis thrombi	12
	Coagulopathy associated abnormalities	• Thrombogenic vasculopathy	1
	Vasculitis	• Livedo • Purpura • Subcutaneous lymphocytic vasculitis • Lymphocytic infiltration of vessels	11
	Possible cytopathic effect	• Intranuclear viral inclusions: 1 • Multinucleated cells: 1 • Intraepidermal vesicle • Dyskeratosis • Necrotic keratinocytes	7
	Non-specific findings associated with skin inflammation (dermatitis)	• Exocytosis • Spongiosis • Acantholysis • Vesicles • Suprabasal clefts • Dermal edema • Vascular ectasia • Dermal mucin • Dermal eosinophils • Superficial dermal inflammatory infiltrates • Perivascular deep inflammation • Peri-eccrine inflammation • Lymphocytic panniculitis • Parakeratosis	15
PLACENTA	Possibly associated with coagulopathy	• Infarcts • Fibrin deposition • Villous agglutination	11
	Inflammation	• Inflammatory infiltrates • Funisitis	1
	Common non-specific changes of varied etiology (e.g. hypertension, diabetes, smoking etc.)	• accelerated villous maturation • Hypertrophy of membrane arterioles • Decidual arteriopathy • Maternal vascular malperfusion • Necrosis of maternal vessels	15
	Pre-existent/unrelated findings	• Chorionic hemangioma	1