Supplementary material Table S1

| LM | CASES | HISTOPATHOLOGY | IMAGE LINK |
|---|---|---|---|
| Leone O, et al. Virchows Arch. 2019 (5) | 45-year male<br>40-year female<br>20-year male<br>30-year female | -Myocyte damage<br>T-lymphocytes with a minor component of macrophages; neutrophils are attracted by myocyte necrosis<br><br>- Lymphocytic infiltrate is limited but is anyway associated with myocyte damage<br><br>- Control biopsy in after previous histologic diagnosis of multifocal lymphocytic myocarditis. Lymphocytic infliltrate is reduced and mainly localized within the mesenchymal/fibrous reparative tissue<br><br>-Immunohistochemistry: CD3+ CD68+ | https://media.springernature.com/full/springer-static/image/art%3A10.1007%2Fs00428-019-02615-8/MediaObjects/428_2019_2615_Fig1_HTML.jpg?as=webp |
| Kindermann I, et al. J Am Coll Cardiol. 2012 (11) | Patients with acute myocarditis | -Necrotic myocytes<br>-Mononuclear cell infiltrates<br>-Immunohistochemistry: CD3+ | https://ars.els-cdn.com/content/image/1-s2.0-S0735109711052004-gr4.jpg |
| Caforio AL, et al. Eur Heart J. 2007 (13) | EMB from 174 subjects with arrhythmias and heart transplantation. | -Myocyte necrosis<br>-Fibrosis<br><br>-162 EMB: lymphocytes infiltrate<br>-5 EMB: giant cells infiltrate<br>-7 EMB: others misted infiltrate<br><br>-PCR analysis for viruses was performed | https://oup.silverchair-cdn.com/oup/backfile/Content_public/Journal/eurheartj/28/11/10.1093_eurheartj_ehm076/2/ehm07601.gif?Expires=1697016563&Signature=1grS0gGlcmtcJYuxiWhJ9ZqeabjP8D7OkVYEo-GuWllnDYb5gX8oQFbAZOVrKkWeAtiDIWNAsbzhsU0VZad8TyrE8pKD3ApbhO7bdRyvulKKHDI9BtHnp-QyY5POvwY5WbK7xtdvXz2uYo3phqerIJUySNKAIEJfHtnCrqOtD9-92gXgVc~kWg8bqkqiUq1ZEYcECKJc- |

| | | | |
|---|---|---|---|
| | | | YKuyIbxzBI3omqnKwaar7YG1ICwyzdGfFwv8STYWjkztkx6zzhfAKecOhnnsCxmbYWijthyYo~zyomri5Sh4hXrYPUIM5eDMCmaaT99OfXUc27SgXtBOQZteO4Cb54a9ug6EsQskyYHUQ__&Key-Pair-Id=APKAIE5G5CRDK6RD3PGA |
| Mahler L, McCleskey B. Am J Forensic Med Pathol. 2022 (16) | 2-year-old African American boy | -Myocytolysis<br>- Karyorrhectic debris<br>-Lymphohistiocytic infiltrate<br>-Lymphocytic infiltrate<br><br>-Myocarditis likely viral in origin<br><br>-PCR for virus negative | https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9076121/bin/fmp-43-e12-g003.jpg |
| Kanaoka K, et al. Circulation 2022 (17) | EMB of 215 patients | - Myocytes damage<br>- 162 LM with lymphocytic infiltrate<br>- 42 EM with eosinophilic infiltrate<br>- 11 GCM with giant cell infiltrate | https://www.ahajournals.org/reader/content/184510a048b/10.1161/CIRCULATIONAHA.121.058869/format/epub/EPUB/graphic/circulationaha.121.058869.fig03.jpg?hmac=1693997579-CroByceU73XB44vh0kimzQ5OcO9BSPSfyZ5KJi86eak%3D |
| Kawada JI, et al. J Cardiol. 2021 (18) | Five pediatric patients | - LM was observed in all patients except in patient 5.<br>- CD3+ CD68+<br><br>-Similar levels of CD4+ and CD8+ T cells were observed in patient 1, while CD8+ cells were predominant in patients 2, 3, and 4. | https://ars.els-cdn.com/content/image/1-s2.0-S0914508720302896-gr2.jpg<br><br>https://ars.els-cdn.com/content/image/1-s2.0-S0914508720302896-gr3.jpg<br>https://ars.els-cdn.com/content/image/1-s2.0-S0914508720302896-gr1.jpg |

| | | | |
|---|---|---|---|
| | | -Conversely, high infiltration of CD68+ cells were seen in patients 2 and 4. CD20+ and CD138+ cells were identified in patient 3<br><br>No significant virus-derived reads were detected | |
| Huang Z, et al. J Int Med Res. 2022 (19) | 63-year-old woman | -Lymphohistiocytic infiltrate<br><br>-Immunohistochemistry: CD3+ CD68+ | https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9251992/bin/10.1177_03000605221108933-fig4.jpg |
| **LHM** | | | |
| Leone O, et al. Virchows Arch. 2019 (5) | 17-year-old male with juvenile idiopathic arthritis | -Active multifocal myocarditis<br>-Macrophages mixed with fibrin and platelets, and minor component of granulocytes and T lymphocytes<br>-Microthrombi and granulocytes were also present in some small vessels.<br>-Immunohistochemistry: CD68+<br><br>-PCR for viral genomes on myocardial tissue and blood was negative as were other laboratory tests for serum immunologic assessment and bacterial or viral infections | https://media.springernature.com/full/springer-static/image/art%3A10.1007%2Fs00428-019-02615-8/MediaObjects/428_2019_2615_Fig6_HTML.png?as=webp |
| Kindermann I, et al. J Am Coll Cardiol. 2012 (11) | Patients with chronic myocarditis | -CD68+ cells are mainly present in areas with fibrosis<br><br>-In situ hybridization reveals PVB19 nucleic acid in endothelial cells of an arteriole in a | https://ars.els-cdn.com/content/image/1-s2.0-S0735109711052004-gr4.jpg |

| | | | |
|---|---|---|---|
| | | patient with chronic myocarditis, whereas enterovirus ribonucleic acid is detected in several myocytes | |
| Cooper LT Jr. N Engl J Med. 2009 (12) | patient with acute myocarditis without other specific indications | -Myocyte damage<br>- Immunohistochemistry: CD3+ CD68+ | https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5814110/bin/nihms940711f1.jpg |
| **NM** | | | |
| Somers GR, et al. Arch Pathol Lab Med. 2005 (25) | Five drownings | -Occasional neutrophils foci of myocyte necrosis -Lymphocytes infiltrate | https://allen.silverchair-cdn.com/allen/content_public/journal/aplm/129/2/10.5858_2005-129-205-aodami/1/i1543-2165-129-2-205-f01.jpeg?Expires=1697106412&Signature=Im1V2MKPWNCnUIsxx9r8YCzVVaaSJKMW69cOC8oIE0744IOoJQDjar-FEvpAy2Pkq4F4shpcADBehgS-G63H4piw-7gU9ZeSaob4taiYPR00NdhNsPjol2sj82~cyFXA55QuUdwWM4t0TdI~E9vjtSH~oGJtcZPalnYdoSaTqpIFHSGLc1LTD~Ok4i5iK7OfRIG7DDcSlQNJWV-szLJPQ-8fQ0D62uRBcRLOQbNbN3iSrIb7pTPrtZQS5sLWAvlADVDM1bd5M~W~aJoNK5WaWaUDQUxEK1cBMDGRGFQ7sHehrTDWybk2hm2EOvxQVPwohA4dRhLp2y~ceeCQy0xkcQ__&Key-Pair-Id=APKAIE5G5CRDK6RD3PGA |
| Hiraiwa H, et al. J Cardiol Cases 2022 (26) | 2-year-old man with streptococcal pharyngitis | - Micro-abscesses<br>- Neutrophilic granulocytes<br>- Gram stain + indicating phagocytosis of streptococci by neutrophils | https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9214811/bin/gr2.jpg |

| | | | |
|---|---|---|---|
| Shilkin KB. Postgrad Med J. 1969 (27) | A 61-year-old male | Diffuse or focal infiltration of<br>polymorphonuclear cells | https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2466746/bin/postmedj00361-0043-a.jpg<br><br>https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2466746/bin/postmedj00361-0043-b.jpg |
| Oka K, et al. Virchows Arch. 2005 (35) | 42-year-old male<br>39-year-old male<br><br>Enterovirus | - Myocytolysis<br>-Patchy necrosis<br>- Neutrophilic abscess<br>-Infiltration of lymphocytes<br>- Cell-debris<br>- Macrophages | https://media.springernature.com/full/springer-static/image/art%3A10.1007%2Fs00428-004-1173-3/MediaObjects/s00428-004-1173-3fhb1.jpg?as=webp<br>https://media.springernature.com/full/springer-static/image/art%3A10.1007%2Fs00428-004-1173-3/MediaObjects/s00428-004-1173-3fhb2.jpg?as=webp |
| **EM** | | | |
| Leone O, et al. Virchows Arch. 2019 (5) | 43-year-old male with primary hypereosinophilic syndrome | Eosinophils degranulated or not, together with some lymphocytes and macrophages and initial thrombotic deposition on the endocardium surface | https://media.springernature.com/full/springer-static/image/art%3A10.1007%2Fs00428-019-02615-8/MediaObjects/428_2019_2615_Fig3_HTML.jpg?as=webp |
| Leone O, et al. Virchows Arch. 2019 (5) | 28-year-old male in therapy with mesalamine for recurrent ulcerative colitis | - Multifocal myocyte damage<br>-Microgranulomas with macrophages, eosinophils, neutrophils, lymphocytes<br><br>Immunohistochemistry CD68 + CD15+ CD3+ | https://media.springernature.com/full/springer-static/image/art%3A10.1007%2Fs00428-019-02615-8/MediaObjects/428_2019_2615_Fig4_HTML.png?as=webp |
| Kanaoka K, et al. Circulation. 2022 (17) | EMB specimens from 215 patients | - Myocytes damage<br>- 162 LM with Lymphocytic infiltrate<br>- 42 EM with eosinophilic infiltrate | https://www.ahajournals.org/reader/content/184510a048b/10.1161/CIRCULATIO |

| | | | |
|---|---|---|---|
| | | - 11 GCM with giant cell infiltrate | NAHA.121.058869/format/epub/EPUB/graphic/circulationaha.121.058869.fig03.jpg?hmac=1693997579-CroByceU73XB44vh0kimzQ5OcO9BSPSfyZ5KJi86eak%3D |
| **GCM** | | | |
| Leone O, et al. Virchows Arch. 2019 (5) | 34-year male | -Widespread and Mixed Inflammation: macrophages, lymphocytes, variable component of eosinophils and plasma cells and a substantial number of scattered multinucleated giant cells.<br>-Significant myocyte damage<br>-No clearly formed granulomas | https://media.springernature.com/full/springer-static/image/art%3A10.1007%2Fs00428-019-02615-8/MediaObjects/428_2019_2615_Fig2_HTML.jpg?as=webp |
| Caforio AL, et al. Eur Heart J. 2007 (13) | EMB from 174 subjects (arrhythmias and heart transplantation with suspicion of myocarditis) | -Myocyte necrosis<br>-Fibrosis<br><br>-162 EMB: lymphocytes infiltrate<br>-5 EMB: giant cells infiltrate<br>-7 EMB: others misted infiltrate<br><br>-PCR analysis for viruses was performed | https://oup.silverchair-cdn.com/oup/backfile/Content_public/Journal/eurheartj/28/11/10.1093_eurheartj_ehm076/2/ehm07601.gif?Expires=1697016563&Signature=1grS0gGlcmtcJYuxiWhJ9ZqeabjP8D7OkVYEo-GuWllnDYb5gX8oQFbAZOVrKkWeAtiDIWNAsbzhsU0VZad8TyrE8pKD3ApbhO7bdRyvulKKHDI9BtHnp-QyY5POvwY5WbK7xtdvXz2uYo3phqerIJUySNKAIEJfHtnCrqOtD9-92gXgVc~kWg8bqkqiUq1ZEYcECKJc-YKuyIbxzBI3omqnKwaar7YG1ICwyzdGfFwv8STYWjkztkx6zzhfAKecOhnnsCxmbYWijthyYo~zyomri5Sh4hXrYPUIM5eDMCmaaT99OfXUc27SgXtBOQZteO4Cb54a9ug6EsQskyYHUQ__&Key-Pair-Id=APKAIE5G5CRDK6RD3PGA |

| | | | |
|---|---|---|---|
| Kanaoka K, et al. Circulation. 2022 (17) | EMB specimens from 215 patients | - Myocytes damage<br>- 162 LM with Lymphocytic infiltrate<br>- 42 EM with eosinophilic infiltrate<br>- 11 GCM with giant cell infiltrate | https://www.ahajournals.org/reader/content/184510a048b/10.1161/CIRCULATIONAHA.121.058869/format/epub/EPUB/graphic/circulationaha.121.058869.fig03.jpg?hmac=1693997579-CroByceU73XB44vh0kimzQ5OcO9BSPSfyZ5KJi86eak%3D |
| Larsen BT, et al. Circulation. 2013 (42) | Six patients | - cardiomyocyte necrosis and cardiomyocyte hypertrophy in all cases<br>-Giant cells, histiocites, T- and B- lymphocytes<br><br>-Immunohistochemistry: prevalent CD3+ with scattered CD20+ and numerous CD68+ cells | https://www.ahajournals.org/cms/asset/aab95466-3982-4d1c-87b6-c2d085950430/39fig03.jpg<br>https://www.ahajournals.org/cms/asset/1e1f3d2c-a6f8-49cc-a31a-61a2afdd8e47/39fig04.jpg |
| **CS** | | | |
| Leone O, et al. Virchows Arch. 2019 (5) | -47-year female with isolated cardiac sarcoidosis<br>- 32-year-old female with systemic sarcoidosis and cardiac involvement | -Myocyte damage is usually not significant near granulomata<br>- Epithelioid granulomata with giant cells, surrounded by lymphocytes and fibrous tissue.<br>-Himmunoistochemstry: CD68+ CD3+<br><br>-Mallory trichrome | https://media.springernature.com/full/springer-static/image/art%3A10.1007%2Fs00428-019-02615-8/MediaObjects/428_2019_2615_Fig2_HTML.jpg?as=webp |
| **MVMI** | | | |
| Fedrigo M, et al. Am J Transplant. 2015 (22) | Case-controlled pilot study evaluated myocardial inflammatory burden<br>Antibody-mediated rejection<br>EMB from 65 right ventricle | -Intravascular monocytes with endothelial damage<br>-Capillary deposition of complement<br><br>-Himmunoistochemstry: C4d + CD3+ intravascular localization | https://ars.els-cdn.com/content/image/1-s2.0-S1600613522000314-gr1.jpg<br>https://ars.els-cdn.com/content/image/1-s2.0-S1600613522000314-gr3.jpg<br>https://ars.els-cdn.com/content/image/1-s2.0-S1600613522000314-gr4.jpg |
| **TM** | | | |

| | | | |
|---|---|---|---|
| Leone O, et al. Virchows Arch. 2019 (5) | No data | Early stage: necrotic myocytes myofibre eosinophilic changes<br>vacuolar degeneration<br>coagulative necrosis contraction band necrosis<br>Phase of 'myocarditis: inflammatory infiltrates primarily composed of macrophages, occasional neutrophils and a small number of lymphocytes CD68+<br>CD3+ | https://media.springernature.com/full/springer-static/image/art%3A10.1007%2Fs00428-019-02615-8/MediaObjects/428_2019_2615_Fig7_HTML.jpg?as=webp |
| **SARS-CoV-2 infection and/or vaccination myocarditis** | | | |
| | Many more morphological and biomolecular documentations (about 800 well documented), in the period 2020-2024 due to an increase in autopsies aimed at COVID-19 deaths | | |

Legend: LM Lymphocytic Myocarditis; CD3+ T lymphocytes; CD68+ macrophages; EMB endomyocardial biopsy; PCR Polymerase Chain Reaction; GCM giant cell myocarditis; CD4+ T Helper lymphocytes; CD8+ cytotoxic T lymphocytes; CD20+ B lymphocytes; CD138+ plasma cells; LHM lympho-histiocitary myocarditis; NM neutrophilic myocarditis; EM eosinophilic myocarditis; Gram stain + histochemical staining to distinguish bacteria; EM eosinophilic myocarditis; CD15+ marker for myeloid lineages and neutrophilic granulocytes; GCM giant cell myocarditis; CS cardiac sarcoidosis; : MVMI myocarditis with vasculitis and microvascular inflammation; C4d + complement component; TM toxic myocarditis