Supplementary material

Supplementary File 1. Details of the analysis not included in the qualitative synthesis (1-287)

Acute leukemia

Demographic and clinical variables	**Total =165**
Age (n=118), mean (range)	61.48 (3-76)
Gender (n=165) M, %	99 (60)
PE appearance (n=164), n,% • At HD presentation • During follow up	 89 (54.2) 75 (45.8)
PE side (n=116), n,% • Bilateral • Monolateral Left Right Side NA	 32 (27.6) 84 (72.4) 79 (94.0) 4 (4.7) 1 (1.3)
Neoplastic cells in cytologic examination (n=164) n ,%	90 (54.9)
PE type (n=17) n , % • Exudate • Trasudate	 17 (100) 0
Pleural biopsy (n=3) • Histologic findings compatible with diagnosis	 0 (0)

M=males; n=number; PE: pleural effusion; HD: haematological disorder; NA:information not available

Pleural liquid composition	**Mean ± SD**
LDH UI/L (n=14)	1613,29 (±3562.33)
Proteins g /dL (n=13)	5.22 (±2.10)
Glucose mg/dL (n=8)	111.63 (±73.6)
ADA U/L (n=16)	47.22 (±72.35)

LDH: lactate dehydrogenase; ADA: adenosine deaminase

Therapy	
Treatment (n=19)* • Yes • No (Palliative/nothing)	 17 (89.4) 2 (10.6)
BMT/SCT	0 (0)
Pleural decortication	0 (0)
Chest tube	4 (23.5)
Evacuative thoracenteses	3 (17.6)
Pleurodesis	3 (17.6)
Radiotherapy	0 (0)
Chemotherapy	15 (88.2)
Steroids	12 (70.6)
Intrapleural drug injection	0 (0)
Outcome (2 years) (n=114), n, % • Alive • Death	 90 (78.9) 24 (21.1)

n=number; BMT/SCT: bone marrow transplantation/stem cells transplantation

*Percentage values refer to single procedures/treatments referred to the whole cohort of treated patients (17 cases). Treatments were administered alone or in combination

Myeloma

Demographic and clinical variables	**Total =228**
Age (n=228), mean (range)	59.58 (4-92)
Gender (n=228) M, %	127 (55.7)
PE appearance (n=215), n,% • At HD presentation • During follow up	 114 (53) 101 (47)
PE side (n=156), n,% • Bilateral • Monolateral Left Right Side NA	 51 (32.7) 105 (67.3) 67 (63.8) 24 (22.8) 14 (13.4)
Neoplastic cells in cytologic examination (n=140) n ,%	128 (91.4)
PE type (n=33) n , % • Exudate • Trasudate	 31 (93.9) 2 (6.1)
Pleural biopsy (n=23) • Histologic findings compatible with diagnosis	 18 (78.3)

M=males; n=number; PE: pleural effusion; HD: haematological disorder; NA:information not available

Pleural liquid composition: NA

NA:information not available

Therapy	
Treatment (n=126)* • Yes • No (Palliative/nothing)	 110 (87.3) 16 (12.7)
BMT/SCT	10 (9.1)
Pleural decortication	1 (0.9)
Chest tube	13 (11.8)
Evacuative thoracenteses	8 (7.3)
Pleurodesis	8 (7.3)
Radiotherapy	7 (6.4)
Chemotherapy	93 (84.5)
Steroids	68 (61.8)
Intrapleural drug injection	1 (0.6)
Outcome (2 years) (n=136), n, % • Alive • Death	 50 (36.8) 86 (63.2)

n=number; BMT/SCT: bone marrow transplantation/stem cells transplantation

*Percentage values refer to single procedures/treatments referred to the whole cohort (17 cases). Treatments were administered alone or in combination

IgG4-related disease

Demographic and clinical variables	**Total =28**
Age (n=28), mean (range)	70.46 (43-84)
Gender (n=28) M, %	25 (89.3)
PE appearance (n=16), n,% • At HD presentation • During follow up	 14 (87.5) 2 (12.5)
PE side (n=15), n,% • Bilateral • Monolateral Left Right	 6 (40) 9 (60) 3 (33.3) 6 (66.7)
PE type (n=13) n , % • Exudate • Trasudate	 13 (100%) 0
Pleural biopsy (n=22) • Histologic findings compatible with diagnosis	 19 (86.4)

M=males; n=number; PE: pleural effusion; HD: haematological disorder; NA:information not available

Pleural liquid composition	**Mean ± SD**
LDH UI/L (n=11)	1072.45 (±1631.43)
Proteins g /dL (n=16)	3.92 (±0.50)

LDH: lactate dehydrogenase

Therapy	
Treatment (n=12)* • Yes • No (Palliative/nothing)	 12 (100) 0 (0)
BMT/SCT	0 (0)
Pleural decortication	1 (10)
Chest tube	2 (20)
Evacuative thoracenteses	1 (10)
Pleurodesis	2 (20)
Radiotherapy	0 (0)
Chemotherapy	6 (60)
Steroids	12 (63.1)
Intrapleural drug injection	0 (0)
Outcome (2 years) (n=12), n, % • Alive • Death	 4 (33.3) 24 (66.7)

n=number; BMT/SCT: bone marrow transplantation/stem cells transplantation

*Percentage values refer to single procedures/treatments referred to the whole cohort (17 cases). Treatments were administered alone or in combination

Hodgkin's lymphoma

Demographic and clinical variables	**Total =272**
Age (n=229), mean (range)	18.03 (4-92)
Gender (n=255) M, %	121 (47.4)
PE appearance (n=245), n,% • At HD presentation • During follow up	 222 (90.6) 23 (9.4)
PE side (n=254), n,% • Bilateral • Monolateral Left Right Side NA	 86 (33.8) 168 (66.2) 17 (10.1) 134 (79.8) 17 (10.1)
Neoplastic cells in cytologic examination (n=13) n ,%	9 (69.2)
PE type (n=8) n , % • Exudate • Trasudate	 7 (87.5) 1 (12.5)
Pleural biopsy (n=1) • Histologic findings compatible with diagnosis	 1 (100)

M=males; n=number; PE: pleural effusion; HD: haematological disorder; NA:information not available

Pleural liquid composition: NA

Therapy	
Treatment (n=221)* • Yes • No (Palliative/nothing)	 220 (99.5) 1 (0.5)
BMT/SCT	0 (0)
Pleural decortication	0 (0)
Chest tube	0 (0)
Evacuative thoracenteses	0 (0)
Pleurodesis	0 (0)
Radiotherapy	0 (0)
Chemotherapy	219 (99.5)
Steroids	217 (98.6)
Intrapleural drug injection	0 (0)
Outcome (2 years) (n=246), n, % • Alive • Death	 240 (97.6) 6 (2.4)

n=number; BMT/SCT: bone marrow transplantation/stem cells transplantation

*Percentage values refer to single procedures/treatments referred to the whole cohort (17 cases). Treatments were administered alone or in combination

Non Hodgkin's lymphoma

Demographic and clinical variables	**Total =430**
Age (n=430), mean (range)	57.79 (2-98)
Gender (n=428) M, %	273 (63.8)
PE appearance (n=341), n,% • At HD presentation • During follow up	 171 (50.1) 170 (49.9)
PE side (n=323), n,% • Bilateral • Monolateral Left Right Side NA	 121 (37.5) 202 (62.5) 71 (35.2) 73 (36.1) 58 (28.7)
Neoplastic cells in cytologic examination (n=300) n ,%	194 (64.7)
PE type (n=209) n , % • Exudate • Trasudate	 194 (92.8) 15 (7.2)
Pleural biopsy (n=30) • Histologic findings compatible with diagnosis	 22 (73.3)

M=males; n=number; PE: pleural effusion; HD: haematological disorder; NA:information not available

Pleural liquid composition	**Mean ± SD**
LDH UI/L (n=46)	1895.37 (±3202.23)
Proteins g /dL (n=41)	4.88 (±1.80)
Glucose mg/dL (n=33)	104.28 (±29.40)
ADA U/L (n=9)	86.50 (±26.33)

Therapy	
Treatment (n=280) • Yes • No (Palliative/nothing)	 252 (90) 28 (10)
BMT/SCT	61 (24.20)
Pleural decortication	1 (0.40)
Chest tube	37 (14.70)
Evacuative thoracenteses	38 (15.08)
Pleurodesis	22 (8.73)
Radiotherapy	13 (5.16)
Chemotherapy	172 (68.25)
Steroids	156 (61.90)
Intrapleural drug injection	6 (2.38)
Surgery	3 (1.19)
Outcome (2 years) (n=266), n, % • Alive • Death	 148 (55.6) 24 (44.4)

n=number; BMT/SCT: bone marrow transplantation/stem cells transplantation

Chronic myeloproliferative disorders

Demographic and clinical variables	**Total =25**
Age (n=25), mean (range)	63.16 (33-78)
Gender (n=25) M, %	14 (56)
PE appearance (n=25), n,% • At HD presentation • During follow up	 8 (32) 17 (68)
PE side (n=23), n,% • Bilateral • Monolateral Left Right	 7 (30.4) 16 (69.6) 9 (56.2) 7 (43.8)
Neoplastic cells in cytologic examination (n=24) n ,%	13 (54.2)
PE type (n=24) n , % • Exudate • Trasudate	 24 (100) 0 (0)
Pleural biopsy (n=4) • Histologic findings compatible with diagnosis	 3 (75)*

*Jowitt SN et al,Naina HV et al, Loren I et al, Schwarz C et al

Pleural liquid composition: NA

Therapy	
Treatment (n=4) • Yes • No (Palliative/nothing)	 3 (75) 1 (25)
BMT/SCT	0 (0)
Pleural decortication	0 (0)
Chest tube	2 (66.7)
Evacuative thoracenteses	0 (0)
Pleurodesis	0 (0)
Radiotherapy	0 (0)
Chemotherapy	2 (66.7)
Steroids	2 (66.7)
Intrapleural drug injection	1 (33.3)
Surgery	0 (0)
Outcome (2 years) (n=21), n, % • Alive • Death	 1 (4.8) 20 (95.2)

Thalassemia

Demographic and clinical variables	**Total =12**
Age (n=12), mean (range)	43.92 (29-56)
Gender (n=12) M, %	7 (58.3)
PE appearance (n=12), n,% • At HD presentation • During follow up	 7 (58.3) 5 (41.7)
PE side (n=12), n,% • Bilateral • Monolateral Left Right	 4 (33.3) 8 (66.7) 4 (50) 4 (50)
PE type (n=11) n , % • Exudate • Trasudate	 11 (100) 0 (0)
Pleural biopsy (n=1) • Histologic findings compatible with diagnosis	 0 (0)*

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Pleural liquid composition	**Mean ± SD**
LDH UI/L (n=11)	756.64 (±399.20)
Proteins g /dL (n=10)	4.32 (±1.55)
Glucose mg/dL (n=11)	68.00 (±18.29)

Therapy	
Treatment (n=12) • Yes • No (Palliative/nothing)	 11 (91.7) 1 (8.3)
BMT/SCT	0 (0)
Pleural decortication	1 (9.1)
Chest tube	5 (45.4)
Evacuative thoracenteses	3 (27.3)
Pleurodesis	4 (36.4)
Radiotherapy	0 (0)
Chemotherapy	8 (72.7)
Steroids	6 (54.6)
Intrapleural drug injection	0 (0)
Surgery	0 (0)
Outcome (2 years) (n=10), n, % • Alive • Death	 7 (70) 3 (30)

Other haematological disorders

Demographic and clinical variables	**Total =7**
Age (n=7), mean (range)	59.43 (43-79)
Gender (n=7) M, %	6 (85.7)
Haematological disorder (n=7), n (%) • Castelman's disease • Histiocytic sarcoma • Primary fibrous histiocytoma • PTLD • Rosai-Dorfman disease	 2 (28.6) 1 (14.3) 1 (14.3) 2 (28.6) 1 (14.2)
PE appearance (n=7), n,% • At HD presentation • During follow up	 6 (85.7) 1 (14.3)
PE side (n=6), n,% • Bilateral • Monolateral Left Right	 0 (0) 6 (100) 1 (16.7) 5 (83.3)
Neoplastic cells in cytologic examination (n=6) n ,%	5 (83.3)
PE type (n=2) n , % • Exudate • Trasudate	 2 (100) 0 (0)
Pleural biopsy (n=2) • Histologic findings compatible with diagnosis	 1 (50)*

*histiocytic sarcoma (Jhuang JY et al)

Pleural liquid composition: NA

Therapy	
Treatment (n=5) • Yes • No (Palliative/nothing)	 5 (100) 0 (0)
BMT/SCT	0 (0)
Pleural decortication	0 (0)
Chest tube	0 (0)
Evacuative thoracenteses	0 (0)
Pleurodesis	0 (0)
Radiotherapy	0 (0)
Chemotherapy	5 (100)
Steroids	2 (40)
Intrapleural drug injection	0 (0)
Surgery	0 (0)
Outcome (2 years) (n=6), n, % • Alive • Death	 3 (50) 3 (50)

Chronic laeukemia

Demographic and clinical variables	**Total =49**
Age (n=49), mean (range)	64.65 (4-49)
Gender (n=49) M, %	28 (57.1)
PE appearance (n=48), n,% • At HD presentation • During follow up	 25 (51) 23 (49)
PE side (n=48), n,% • Bilateral • Monolateral Left Right NA	 19 (39.6) 29 (60.4) 9 (31) 10 (34.5) 10 (34.5)
Neoplastic cells in cytologic examination (n=48) n ,%	29 (60.4)
PE type (n=48) n , % • Exudate • Trasudate	 39 (81.2) 9 (18.8)
Pleural biopsy (n=4) • Histologic findings compatible with diagnosis	 3(75)*

*Miyahara M et al , Dhodapkar M et al, Hu L et al, van den Berge M et al

Pleural liquid composition	**Mean ± SD**
LDH UI/L (n=24)	3139.46 (±4481.18)
Proteins g /dL (n=22)	4.7 (±1.7)
Glucose mg/dL (n=20)	67.3 (±37.2)
ADA U/L (n=4)	390.7 (±71.57)

Therapy	
Treatment (n=22) • Yes • No (Palliative/nothing)	 20 (90.9) 2 (9.1)
BMT/SCT	1 (4.5)
Pleural decortication	0 (0)
Chest tube	4 (18.2)
Evacuative thoracenteses	3 (13.6)
Pleurodesis	2 (9)
Radiotherapy	3 (13.6)
Chemotherapy	15 (68.2)
Steroids	8 (36.4)
Intrapleural drug injection	1 (4.5)
Surgery	0 (0)
Outcome (2 years) (n=20), n, % • Alive • Death	 10 (50) 10 (50)

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