

**Tabla A.1.** Lista de artículos españoles excluidos

<b>Autor, año, referencia</b>	<b>Razón de exclusión</b>
Ocaña et al, 1983 <sup>1</sup>	Combinación de líquido pleural y ascítico solapamiento
Martínez-Vázquez et al, 1984 <sup>2</sup>	Combinación de líquido pleural y ascítico solapamiento
Ocaña et al, 1986 <sup>3</sup>	Duplicación de pacientes
Cortejoso et al, 1987 <sup>4</sup>	Combinación de líquido pleural y ascítico
Segura et al, 1989 <sup>5</sup>	Combinación de líquido pleural y ascítico y duplicación de pacientes
Querol et al, 1990 <sup>6</sup>	Imposibilidad de construir tabla 2x2
Ribera et al, 1990 <sup>7</sup>	Duplicación de pacientes
Fernández de Quirós et al, 1992 <sup>8</sup>	Imposibilidad de construir tabla 2x2
San José et al, 1992 <sup>9</sup>	Duplicación de pacientes
Pérez-Rodríguez et al, 1992 <sup>10</sup>	Duplicación de pacientes
Valdés et al, 1993 <sup>11</sup>	Duplicación de pacientes
Orriols et al, 1994 <sup>12</sup>	Imposibilidad de construir tabla 2x2
Valdés et al, 1995 <sup>13</sup>	Duplicación de pacientes
Haro et al, 1996 <sup>14</sup>	Imposibilidad de construir tabla 2x2

Valdés et al, 1996 <sup>15</sup>	Duplicación de pacientes
Haro et al, 1997 <sup>16</sup>	Imposibilidad de construir tabla 2x2 y duplicación de pacientes
Valdés et al, 1998 <sup>17</sup>	Imposibilidad de construir tabla 2x2 y duplicación de pacientes
Vidal et al, 1998 <sup>18</sup>	No aportar datos suficientes sobre la etiología del grupo de pacientes no tuberculosos
De la Cruz et al, 1999 <sup>19</sup>	Imposibilidad de construir tabla 2x2
Merino et al, 1999 <sup>20</sup>	Población pediátrica
Pérez-Rodríguez et al, 1999 <sup>21</sup>	Duplicación de pacientes
San José et al, 1999 <sup>22</sup>	Duplicación de pacientes
Jiménez et al, 2001 <sup>23</sup>	Objetivo diferente
Porcel et al, 2002 <sup>24</sup>	Duplicación de pacientes
Alemán et al, 2003 <sup>25</sup>	Objetivo diferente
Porcel et al, 2003 <sup>26</sup>	Duplicación de pacientes
Porcel et al, 2003 <sup>27</sup>	Duplicación de pacientes
Porcel et al, 2004 <sup>28</sup>	Duplicación de pacientes
Bouzas et al, 2007 <sup>29</sup>	Objetivo diferente
Porcel et al, 2008 <sup>30</sup>	Duplicación de pacientes
Valdés et al, 2009 <sup>31</sup>	Duplicación de pacientes

Valdés et al, 2010 <sup>32</sup>	Duplicación de pacientes
Bielsa et al, 2012 <sup>33</sup>	Duplicación de pacientes
Trapé et al, 2012 <sup>34</sup>	Objetivo diferente
Valdés et al, 2014 <sup>35</sup>	Duplicación de pacientes
Valdés et al, 2015 <sup>36</sup>	Imposibilidad de construir tabla 2x2 y duplicación de pacientes

**Tabla A.2** Lista de artículos no españoles excluidos

<b>Autor, año, referencia</b>	<b>Razón de exclusión</b>
Piras et al, 1978 <sup>37</sup>	No se especifica el método diagnóstico
Maritz et al, 1982 <sup>38</sup>	<i>Gold estándar</i> diagnóstico inapropiado
Tamura et al, 1988 <sup>39</sup>	<i>Gold estándar</i> diagnóstico inapropiado
Subhakar et al, 1991 <sup>40</sup>	<i>Gold estándar</i> diagnóstico inapropiado
Maldhure et al, 1994 <sup>41</sup>	<i>Gold estándar</i> diagnóstico inapropiado
Richter et al, 1994 <sup>42</sup>	<i>Gold estándar</i> diagnóstico inapropiado
Burgess et al, 1995 <sup>43</sup>	Duplicación de pacientes
Melo et al, 1997 <sup>44</sup>	Tesis doctoral
Parandaman et al, 2000 <sup>45</sup>	Grupo control inadecuado
Silva et al, 2000 <sup>46</sup>	Tesis doctoral
Nagesh et al, 2001 <sup>47</sup>	<i>Gold estándar</i> diagnóstico inapropiado
Sharma et al, 2001 <sup>48</sup>	<i>Gold estándar</i> diagnóstico inapropiado
Mane et al, 2001 <sup>49</sup>	Población pediátrica
Chen et al, 2004 <sup>50</sup>	<i>Gold estándar</i> diagnóstico inapropiado

Saluja et al, 2004 <sup>51</sup>	<i>Gold estándar</i> diagnóstico inapropiado
Bem et al, 2005 <sup>52</sup>	<i>Gold estándar</i> diagnóstico inapropiado
Morimoto et al, 2006 <sup>53</sup>	<i>Gold estándar</i> diagnóstico inapropiado
Mishra et al, 2006 <sup>54</sup>	Población pediátrica
Joshi et al, 2007 <sup>55</sup>	No especifica el método diagnóstico
Verma et al, 2008 <sup>56</sup>	No especifica el método diagnóstico
Bandyopadhyay et al, 2008 <sup>57</sup>	Grupo control inadecuado
Gupta et al, 2010 <sup>58</sup>	<i>Gold estándar</i> diagnóstico inapropiado
Bhutia et al, 2011 <sup>59</sup>	Población pediátrica
Wang et al, 2012 <sup>60</sup>	<i>Gold estándar</i> diagnóstico inapropiado
Pal et al, 2012 <sup>61</sup>	<i>Gold estándar</i> diagnóstico inapropiado
Patel et al, 2012 <sup>62</sup>	<i>Gold estándar</i> diagnóstico inapropiado
Bharat et al, 2013 <sup>63</sup>	<i>Gold estándar</i> diagnóstico inapropiado
Kelam et al, 2013 <sup>64</sup>	<i>Gold estándar</i> diagnóstico inapropiado
Agrawal et al, 2014 <sup>65</sup>	<i>Gold estándar</i> diagnóstico inapropiado
Kapse et al, 2014 <sup>66</sup>	No especifica el método diagnóstico
Mehta et al, 2014 <sup>67</sup>	<i>Gold estándar</i> diagnóstico inapropiado

Ramyalakshmi et al, 2014<sup>68</sup>

*Gold estándar* diagnóstico inapropiado

Jindal et al, 2015<sup>69</sup>

No especifica el método diagnóstico

**Tabla A.3** Características de los estudios no españoles que evalúan el rendimiento diagnóstico de la adenosina desaminasa en el líquido pleural

<b>Autor</b>	<b>País</b>	<b>Total pacientes</b>	<b>Punto de corte de ADA (U/L)</b>	<b>VP</b>	<b>FN</b>	<b>FP</b>	<b>VN</b>	<b>Técnica de medición de DA</b>
Blake et al <sup>70</sup>	Sudáfrica	202	30	74	8	2	118	Cinético manual
Petterson et al <sup>71</sup>	Finlandia	86	50	14	0	10	62	Giusti
Niwa et al <sup>72</sup>	Japón	58	30	22	6	4	26	NE
Raj et al <sup>73</sup>	India	55	40	30	0	1	24	Giusti
Van Keimpema et al <sup>74</sup>	Holanda	90	40	4	1	8	77	Cinético automatizado
Strankinga et al <sup>75</sup>	Holanda	86	53	10	0	10	66	Giusti
Teo et al <sup>76</sup>	Singapur	89	50	22	0	6	61	Giusti
Shina et al <sup>77</sup>	India	53	30	37	0	0	16	Giusti
Filho et al <sup>78</sup>	Brasil	99	40	37	0	15	47	Giusti
Woon Kim et al <sup>79</sup>	Corea	50	41	25	3	3	19	Giusti
Kao et al <sup>80</sup>	China	59	60	18	0	5	36	NE
Bangar et al <sup>81</sup>	India	44	40	15	0	12	17	Giusti
Hsu et al <sup>82</sup>	China	39	50	18	1	2	18	Giusti
Moriwaki et al <sup>83</sup>	Japón	51	33	14	0	2	35	Cinético automatizado
Gilhotra et al <sup>84</sup>	India	73	40	30	0	4	39	Giusti

Baganha et al <sup>85</sup>	Portugal	73	40	35	0	0	38	Giusti
Gupta et al <sup>86</sup>	India	53	50,75	36	0	1	16	Giusti
Bañales et al <sup>87</sup>	México	218	70	80	2	6	130	Giusti
Maartens et al <sup>88</sup>	Sudáfrica	109	45	48	14	8	39	Giusti
Shimokata et al <sup>89</sup>	Japón	29	30	12	1	1	15	Cinético automatizado
Gourgoulis et al <sup>90</sup>	Grecia	120	38	37	0	2	81	Giusti
Nagaraja et al <sup>91</sup>	India	30	50	15	0	0	15	Giusti
Muranishi et al <sup>92</sup>	Japón	51	50	10	8	8	25	Giusti
Prasad et al <sup>93</sup>	India	47	30	21	0	0	26	Cinético manual
Kaur et al <sup>94</sup>	India	73	30	14	7	4	48	Giusti
De Olivera et al <sup>95</sup>	Brasil	248	40	24	2	5	217	Giusti
Aoki et al <sup>96</sup>	Japón	39	39	9	2	3	25	Cinético automatizado
Ungerer et al <sup>97</sup>	Sudáfrica	47	35	41	0	0	6	Giusti
Chiang et al <sup>98</sup>	China	93	60	23	4	3	63	Giusti
Shibagaki et al <sup>99</sup>	Japón	66	30	31	2	0	33	Cinético automatizado
Orphanidou et al <sup>100</sup>	Grecia	97	40	26	7	4	60	Giusti
Burgess et al <sup>101</sup>	Sudáfrica	269	50	98	11	25	135	Giusti
Chalhoub et al <sup>102</sup>	Brasil	212	40	140	10	4	58	Giusti
Bottini et al <sup>103</sup>	Brasil	80	45	16	0	2	62	Giusti
Kim et al <sup>104</sup>	Corea	70	32	26	13	3	28	Cinético automatizado
Ogawa et al <sup>105</sup>	Japón	41	33	15	1	5	20	NE



Kuralai et al <sup>106</sup>	Turquía	89	30	24	6	7	52	Cinético manual
Riantawan et al <sup>107</sup>	Tailandia	216	60	95	5	18	98	Giusti
Ghelani et al <sup>108</sup>	India	81	40	41	13	16	11	Giusti
Villegas et al <sup>109</sup>	Colombia	112	45,5	37	5	10	60	Giusti
Gourguner et al <sup>110</sup>	Turquía	87	50	33	3	6	45	Giusti
Lim et al <sup>111</sup>	Corea	28	40	10	1	2	15	Cinético automatizado
Reechaipichitkul et al <sup>112</sup>	Tailandia	132	48	40	10	16	66	Giusti
Yamada et al <sup>113</sup>	Japón	63	45	18	3	5	37	Cinético manual
Andreasyan et al <sup>114</sup>	Armenia	69	20	45	2	2	20	Cinético manual
Aoe et al <sup>115</sup>	Japón	46	40	10	0	3	33	Cinético automatizado
Lima et al <sup>116</sup>	Brasil	40	40	8	3	8	21	Giusti
Tahhan et al <sup>117</sup>	Turquía	54	40	20	2	3	29	Giusti
Kaseimann et al <sup>118</sup>	Brasil	93	35	63	2	1	27	Giusti
Neves et al <sup>119</sup>	Brasil	215	39	98	6	19	92	Giusti
Poyraz et al <sup>120</sup>	Turquía	45	45	13	2	0	30	Giusti
El-Ansary et al <sup>121</sup>	Egipto	39	35	12	3	2	22	Giusti
Gaga et al <sup>122</sup>	Grecia	70	50	35	1	1	33	Giusti
Moon et al <sup>123</sup>	Corea	95	45	34	7	3	51	Giusti
Okamoto et al <sup>124</sup>	Japón	43	32	11	0	1	31	Cinético automatizado
Sharma et al <sup>125</sup>	India	52	33	32	3	0	17	Giusti
Tozkoparan et al <sup>126</sup>	Turquía	55	50	24	2	2	27	NE
Celik et al <sup>127</sup>	Turquía	45	35,6	17	0	0	28	Giusti
Hassanein et al <sup>128</sup>	Egipto	50	26,2	19	1	5	25	Giusti

Katiyar et al <sup>129</sup>	India	102	38	47	5	7	43	NE
Pandit et al <sup>130</sup>	India	72	40	22	0	25	25	Giusti
Ogata et al <sup>131</sup>	Japón	435	36	106	18	46	265	Cinético automatizado
Yildiz et al <sup>132</sup>	Turquía	196	55	99	15	11	71	Giusti
Liu et al <sup>133</sup>	China	66	30	17	7	2	40	Giusti
Ambade et al <sup>134</sup>	India	81	71	38	10	8	25	Cinético automatizado
Kalantri et al <sup>135</sup>	India	100	44,75	46	4	4	46	Giusti
Kumar et al <sup>136</sup>	India	83	40	67	0	2	14	Cinético automatizado
Helmy et al <sup>137</sup>	Egipto	30	30	15	4	2	9	Cinético automatizado
Khan et al <sup>138</sup>	Qatar	103	16,65	62	10	8	23	Cinético automatizado
Keng et al <sup>139</sup>	China	88	15,5	26	5	7	50	Giusti
Sheti et al <sup>140</sup>	India	45	52,4	25	6	4	10	Giusti
Shah et al <sup>141</sup>	India	100	45	72	8	3	17	Giusti
Kumar et al <sup>142</sup>	India	26	40	4	2	2	18	Giusti

ADA: adenosina desaminasa; DPT: derrame pleural tuberculoso; FN: falsos negativos; FP: falsos positivos; NE: no especificado; VN: verdaderos negativos; VP: verdaderos positivos.

## Bibliografía

1. Ocaña I, Martínez-Vázquez J M, Segura R M, Fernandez-De-Sevilla T, Capdevila JA. Adenosine deaminase in pleural fluids. Test for diagnosis of tuberculous pleural effusion. *Chest* 1983;84:51–3.
2. Martínez-Vázquez JM, Ocaña I, Ribera E, Capdevila JA, Fernández de Sevilla T, Segura R, et al. Diagnóstico temprano de la tuberculosis pleuroperitoneal mediante la determinación de adenosina desaminasa. *Med Clin (Barc)* 1984;83:578-80.
3. Ocaña I, Martínez-Vázquez J M, Ribera E, Segura RM, Pascual C, et al. Adenosine deaminase activity in the diagnosis of lymphocytic pleural effusions of tuberculous, neoplastic and lymphomatous origin. *Tubercle* 1986;67:141–5.
4. Cortejoso R, Rodrigo MP, Rodríguez MA, Peñas L. Importancia de la determinación de la adenosina desaminasa en los derrames pleuroperitoneales. *Med Clin (Barc)* 1987;88:826.
5. Segura R M, Pascual C, Ocaña I, Martínez-Vázquez JM, Ribera E, Ruiz I, et al. Adenosine deaminase in body fluids: a useful diagnostic tool in tuberculosis. *Clin Biochem* 1989;22:141–8.
6. Querol J M, Barbé F, Manresa F, Esteban L, Cañete C. Low value of adenosine deaminase in tuberculous pleural effusions. *Eur Respir J* 1990;3:586–7.
7. Ribera E, Martínez-Vázquez J M, Ocaña I, Ruiz I, Segura RM, Encabo G, et al. Interferón gamma y adenosina desaminasa en las pleuritis. *Med Clin (Barc)* 1990;94:364-7.

8. Fernández de Quirós J, Susano RC, Telenti M, Rodríguez C. Adenosina desaminasa en tumores: ¿un marcador de invasión pleural por procesos linfoproliferativos? *Med Clin (Barc)* 1992; 98:276-7.
9. San José E, Valdés L, Sarandeses A, Alvarez D, Chomon B. Diagnostic value of adenosine deaminase and lysozyme in tuberculous pleurisy. *Clin Chim Acta* 1992;209: 73–81.
10. Pérez Rodríguez E, Ferrando C, Flandes J. Adenosine deaminase in pleural effusion. *Chest* 1992;102:325–6.
11. Valdés L, San José E, Álvarez D, Sarandeses A, Pose A, Chomón B, et al. Diagnosis of tuberculous pleurisy using the biologic parameters adenosine deaminase, lysozyme and interferon gamma. *Chest* 1993;103:458–65.
12. Orriols R, Coloma R, Ferrer J, Vidal R, Morell F. Adenosine deaminase in tuberculous pleural effusion. *Chest* 1994;106:1633–4.
13. Valdés L, Álvarez D, San José E, Juanatey JR, Pose A, Valle JM, et al. Value of adenosine deaminase in the diagnosis of tuberculous pleural effusions in young patients in a region of high prevalence of tuberculosis. *Thorax* 1995;50:600–3.
14. Haro M, Ruiz-Manzano J, Gallego M, Abad J, Manterola JM, Morera J. Tuberculosis pleural: anàlisis de 105 casos. *Enferm Infecc Microbiol Clin* 1996;14:285-9.
15. Valdés L, San José E, Álvarez D, Valle JM. Adenosine deaminase (ADA) isoenzyme analysis in pleural effusions: diagnostic role, and relevance to the origin of increased ADA in tuberculous pleurisy. *Eur Respir J* 1996;9:747–51.

16. Haro M, Ruiz-Manzano J, Morera J, Gallego M, Manterola JM, Ribas J. Análisis de 90 casos de tuberculosis pleural en relación a los valores de la adenosina desaminasa. *Med Clin (Barc)* 1997;108:452-4.
17. Valdés L, Álvarez D, San José E, Penela P, Valle JM, García-Pazos JM, et al. Tuberculous pleurisy. A study of 254 patients. *Arch Intern Med* 1998;158:2017-21.
18. Vidal E, Del Real E, Areses J. Determinación de adenosina deaminasa en el autoanalizador RA-1000. *Rev diag Biol* 1998;37:247-50.
19. De la Cruz J, Caeiro M, Casal J. Actividad elevada de adenosina deaminasa en los derrames pleurales linfomatosos. *Oncologia* 1999;22:240-3.
20. Merino JM, Carpintero I, Álvarez T, et al. Tuberculous pleural effusion in children. *Chest* 1999;115:26-30.
21. Pérez-Rodríguez E, Pérez WIJ, Sánchez-Henández JJ, Pallarés E, Rubi J, Jimenez D, et al. ADA1/ADAp ratio in pleural tuberculosis: an excellent diagnostic parameter in pleural fluid. *Respir Med* 1999;93:816-21.
22. San José E, Valdés L, Saavedra MJ, De Vega JM, Alvarez D, Viñuela J, et al. Lymphocyte populations in tuberculous pleural effusions. *Ann Clin Biochem* 1999;36:492-500.
23. Jiménez D, Díaz G, Pérez-Rodríguez E. Diagnosis of pleural tuberculosis. *Chest* 2001;121:1005.
24. Porcel JM, Vives M. Adenosine deaminase levels in nontuberculous lymphocytic pleural effusions. *Chest* 2002;121:1379-80.

25. Alemán C, Alegre J, Segura RM, Armadans L, Suriñach JM, Varela E, et al. Polymorphonuclear elastase in the early diagnosis of complicated pyogenic pleural effusions. *Respiration* 2003;70:462-7.
26. Porcel JM, Vives M. Differentiating tuberculous from malignant pleural effusions: a scoring model. *Med Sci Monit* 2003;9:227–32.
27. Porcel JM, Vives M. Etiology and pleural fluid characteristics of large and massive effusions. *Chest* 2003; 124:978-83.
28. Porcel JM, Vives M, Esquerda A, Jover A. Puntos de corte de los parámetros bioquímicos del líquido pleural: su utilidad en el diagnóstico diferencial de 1.040 pacientes con derrame pleural. *An Med Interna* 2004;21:113-7.
29. Bouzas L, San José E, Tutor JC. Chitotriosidase activity in pleural effusions. *Clin Lab* 2007;53:449-52.
30. Porcel JM, Alemán C, Bielsa S, Sarrapio J, Fernández de Sevilla T, Esquerda A. A decision tree for differentiating tuberculous from malignant pleural effusions. *Respir Med* 2008;102:1159-64.
31. Valdés L, San José E, Álvarez D, Golpe A, Valle JM, Penela P, et al. Diagnostic value of interleukin-12 p40 in tuberculous pleural effusions. *Eur Respir J* 2009;33:816-20.
32. Valdés L, San José E, Pose A, Guide F, González-Barcala FJ, Alvarez-Dobaño JM, et al. Diagnosing tuberculous pleural effusion using clinical data and pleural fluid analysis A study of patients less than 40 years-old in an area with a high incidence of tuberculosis. *Respir Med* 2010;104:1211-7.

33. Bielsa S, Palma R, Pardina M, Esquerda A, Light RW, Porcel JM. Comparison of polymorphonuclear and lymphocyte rich tuberculous pleural effusions. *Int J Tuberc Lung Dis* 2013;17:85-9.
34. Trapé J, Molina R, Sant F, Montesinos J, Arnau A, Franquesa J, et al. Diagnostic accuracy of tumour markers in serous effusions: a validation study. *Tumor Biol* 2012;33:1661–8.
35. Valdés L, San José E, Ferreiro L, Golpe A, Gude F, Álvarez-Dobaño JM, et al. Interleukin 27 could be useful in the diagnosis of tuberculous pleural effusions. *Respir Care* 2014;59:399-405.
36. Valdés L, San-José E, Ferreiro L, Golpe A, González-Barcala FJ, Toubes ME, et al. Predicting malignant and tuberculous pleural effusions through demographics and pleural fluid analysis of patients. *Clin Respir J* 2015;9:203-13.
37. Piras M A, Gakis C, Budroni M, Andreoni G. Adenosine deaminase activity: an aid to differential diagnosis. *BMJ* 1978;2:1751–2.
38. Maritz FJ, Malan C, Le Roux I. Adenosine deaminase estimations in the differentiation of pleural effusions. *S Afr Med J* 1982;62:556-8.
39. Tamura S, Nishigaki T, Moriwaki Y. Tumour markers in pleural effusion diagnosis. *Cancer* 1988;61:298–302.
40. Subhakar K, Kotilingam K, Satyasri S. Adenosine deaminase activity in pleural effusions. *Lung India* 1991;9:57–60.

41. Maldhure B R, Bedarkar S P, Kulkarni H R, Papinwar S P. Pleural biopsy and adenosine deaminase in pleural fluid for the diagnosis of tubercular pleural effusion. *Indian J Tuberc* 1994;41:161–5.
42. Richter C, Perenboom R, Swai AB, Kitinya J, Mtoni I, Chande H, et al. Diagnosis of tuberculosis in patients with pleural effusion in an area of HIV infection and limited diagnostic facilities. *Trop Geogr Med* 1994;46:293–7.
43. Burgess L J, Maritz F J, Le Roux I, Taljaard JJ. Use of adenosine deaminase as a diagnostic tool for tuberculous pleurisy. *Thorax* 1995;50:672–4.
44. Melo, FAF. Adenosine deaminase (ADA) activity alone and combined with other variables in the diagnosis of pleural tuberculosis and its applicability in human immunodeficiency virus (HIV) [thesis]. São Paulo: Universidade Federal de São Paulo; 1997.
45. Parandaman V, Narayanan S, Narayanan P R. Utility of polymerase chain reaction using two probes for rapid diagnosis of tubercular pleuritis in comparison to conventional methods. *Indian J Med Res* 2000;112:47–51.
46. Silva Junior CT. Adenosina Deaminase versus pleural histopathology: Evaluation of the importance of isolated thoracentesis for the diagnosis of pleural tuberculosis [thesis]. Rio de Janeiro: Universidade Federal Fluminense; 2000.
47. Nagesh BS, Sehgal S, Jindal SK, Arora SK. Evaluation of polymerase chain reaction for detection of *Mycobacterium tuberculosis* in pleural fluid. *Chest* 2001;119:1737–41.



48. Sharma SK, Suresh V, Mohan A, Kaur P, Saha P, Kumar A, et al. A prospective study of sensitivity and specificity of adenosine deaminase estimation in the diagnosis of tuberculosis pleural effusion. *Indian J Chest Dis Allied Sci* 2001;43:149–55.
49. Mane P, Gupta R, Gera P. Role of pleural fluid adenosine deaminase estimation for the diagnosis of tuberculosis in pediatric surgical patients with suppurative thoracic lesions. *J Indian Assoc Pediatr Surg* 2001;6:125–9.
50. Chen ML, Yu WC, Lam CW, Au KM, Kong FY, Chan AY. Diagnostic value of pleural fluid adenosine deaminase activity in tuberculous pleurisy. *Clin Chim Acta* 2004;341:101–7.
51. Saluja J G, Ajinkya M S, Khanna S. Diagnostic importance of antibodies TBIGG and IgA and adenosine deaminase in tuberculous pleural effusion in Indian population. *Bombay Hosp J* 2004;46:262–7.
52. Bem AF, Caputi CS, Meireles FB, Vargas AP, Carlotto MS, Huber IC. Valor diagnóstico da determinação da atividade da adenosina deaminase no derrame pleural tuberculoso em indivíduos infectados e não infectados pelo HIV. *RBAC*. 2005;37:23-6.
53. Morimoto T, Takanashi S, Hasegawa Y, Fujimoto K, Okudera K, Hayashi A, et al. Level of antibodies against mycobacterial glycolipid in the effusion for diagnosis of tuberculous pleural effusion. *Respir Med* 2006;100:1775–80.
54. Mishra O P, Kumar R, Ali Z, Prasad R, Nath G. Evaluation of polymerase chain reaction and adenosine deaminase assay for the diagnosis of tuberculous effusions in children. *Arch Dis Child* 2006;91:985–9.

55. Joshi MV, Dipnaik K A. Adenosine deaminase activity, marker for tuberculosis. *Indian Pract* 2007; 60:481–4.
56. Verma S K, Dubey A L, Singh P A, Tewerson S L, Sharma D. Adenosine deaminase (ADA) level in tubercular pleural effusion. *Lung India* 2008;25:109–10.
57. Bandyopadhyay D, Gupta S, Banerjee S, Gupta S, Ray D, Bhattacharya S, et al. Adenosine deaminase estimation and multiplex polymerase chain reaction in diagnosis of extra-pulmonary tuberculosis. *Int J Tuberc Lung Dis* 2008;12:1203–8.
58. Gupta B K, Bharat V, Bandyopadhyay D. Role of adenosine deaminase estimation in differentiation of tuberculous and nontuberculous exudative pleural effusions. *J Clin Med Res* 2010;2:79–84.
59. Bhutia N D, Singh Y T, Shyamsunder C, Satyakumar T, Singh M A, Keithellakpam S. Evaluation of adenosine deaminase (ADA) activity in the diagnosis of tuberculous pleural effusion in children. *J Med Soc* 2011;25:48–51.
60. Wang H, Yue J, Yang J, Gao R, Liu J. Clinical diagnostic utility of adenosine deaminase, interferon- $\gamma$ , interferon- $\gamma$ -induced protein of 10kDa, and dipeptidyl peptidase 4 levels in tuberculous pleural effusions. *Heart Lung* 2012;41:70-5.
61. Pal S, Gupta S. Adenosine deaminase: the non-invasive marker of tuberculosis. *J Indian Med Assoc* 2012;110:16–8.

62. Patel S C, Daveshwar M, Shah H, Kaur R. Role of adenosine deaminase estimation in diagnosis of tuberculous pleural effusion. *Gujarat Med J* 2012;67:50–2.
63. Bharat V, Gupta BK, Goel P, Shukla P. Pleural fluid adenosine deaminase activity—can it be a diagnostic biomarker? *IOSR J Dental Med Sci* 2013;5:41–6.
64. Kelam MA, Ganie F A, Shah B A, Ganie SA, Wani ML, Wani NU, et al. The diagnostic efficacy of adenosine deaminase in tubercular effusion. *Oman Med J* 2013;28:417–21.
65. Agrawal A, Tandon R, Singh L, Sinha A. A study of pleural fluid adenosine deaminase levels in tubercular and other exudative pleural effusions. *Asian J Pharm Health Sci* 2014;4:1088-91.
66. Kapse V R, More K S, Mhaisekar D G, Hashmi F. Adenosine deaminase activity in pleural effusion due to various etiologies and its utility as a dignostic tool in tuberculous pleural effusion. *Int J Recent Trends Sci Technol* 2014;12:184–9.
67. Mehta A A, Gupta A S, Ahmed S, Rajesh V. Diagnostic utility of adenosine deaminase in exudative pleural effusions. *Lung India* 2014;31:142–4.
68. Ramyalakshmi KV, Singh RBS, Damodharan J, Sivaprakash. Comparative study of adenosine deaminase and polymerase chain reaction in tuberculous pleural effusion. *Transworld Med J* 2014;2:94–100.
69. Jindal S, Garg P, Dedun AR, Nayi H, Divyashree J, Sahu G. A study of pleural effusion with reference to different diagnostic modalaties. *Int J Adv Med* 2015;2:359–64.

70. Blake J, Berman P. The use of adenosine deaminase assays in the diagnosis of tuberculosis. *S Afr Med J* 1982;62:19-21
71. Pettersson T, Ojala K, Weber T. Adenosine deaminase in the diagnosis of pleural effusions. *Acta Med Scand* 1984;215:299–304.
72. Niwa Y, Kishimoto H, Shimokata K. Carcinomatous and tuberculous pleural effusions. Comparison of tumor markers. *Chest* 1985;87:351-5
73. Raj B, Chopra RK, Lal H, Saini AS, Singh V, Kumar P, et al. Adenosine deaminase activity in pleural fluids – a diagnostic aid in tuberculous pleural effusion. *Indian J Chest Dis Allied Sci* 1985;27:76-80.
74. Van Keimpema AR, Slaats EH, Wagenaar JP. Adenosine deaminase activity, not diagnostic for tuberculous pleurisy. *Eur J Respir Dis* 1987;71:15–8.
75. Strankinga WF, Nauta JJ, Straub JP, Stam J. Adenosine deaminase activity in tuberculous pleural effusions: a diagnostic test. *Tubercle* 1987;68:137–40.
76. Teo SK, Chio LF. Adenosine deaminase in pleural fluid – and enzymatic test for tuberculous pleural effusion. *Singapore Med J* 1987;28:220-4.
77. Sinha PK, Sinha BB, Sinha ARS. Adenosine deaminase activity as a diagnostic index of pleural effusion. *J Indian Med Assoc* 1987;85:11-3.
78. Cestari Filho F, Rassi RH, Mendonça SA, Pires MF, Rassi IE, Morrone N. Adenosine deaminase activity in the diagnosis of pleural effusion. *Rev Paul Med* 1988;105:276-8.

79. Kim JW, Yang IA, Oh EA, Rhyoo YG, Jang YH, Ryang DW, et al. C-reactive protein, sialic acid and adenosine deaminase levels in serum and pleural fluid from patients with pleural effusion. *Korean J Intern Med* 1988;3:122–7.
80. Kao SJ, Wang D, Chang FY, Hsu K, Shen CY, Chen J. The evaluation of ADA activity in pleural effusion for the diagnosis of tuberculous pleural effusion. *Kekkaku* 1988;63:441-6.
81. Bangar SS, Khanade JM, Somani BL, Sinha R, Sharma YV. Adenosine deaminase in the diagnosis of pleural effusions. *Med J Armed Forces India* 1988;44:219–22.
82. Hsu WH, Chiang CD, Chen WT, Chen CF. Diagnostic value of adenosine deaminase and interferon in tuberculous and malignant pleural effusions. *Taiwan I Hsueh Hui Tsa Chih* 1989;88:879–82.
83. Moriwaki Y, Kohjiro N, Itoh M, Nakatsuji Y, Okada M, Ishihara H, et al. Discrimination of tuberculous from carcinomatous pleural effusion by biochemical markers: adenosine deaminase, lysozyme, bronectin and carcinoembryonic antigen. *Jpn J Med* 1989;28:478-84.
84. Gilhotra R, Sehgal S, Jindal SK. Pleural biopsy and adenosine deaminase enzyme activity in effusions of different aetiologies. *Lung India* 1989;7:122-4.
85. Baganha MF, Pego A, Lima MA, Gaspar EV, Pharm B, Cordeiro AR. Serum and pleural adenosine deaminase. Correlation with lymphocytic populations. *Chest* 1990;97:605-10.
86. Gupta DK, Suri JC, Goel A. Efficacy of adenosine deaminase in the diagnosis of pleural effusions. *Indian J Chest Dis Allied Sci* 1990;32:205-8.

87. Bañales JL, Pineda PR, Fitzgerald JM, Rubio H, Selman M, Salazar-Lezama M. Adenosine deaminase in the diagnosis of tuberculous pleural effusions. A report of 218 patients and review of the literature. *Chest* 1991;99:355-7.
88. Maartens G, Bateman ED. Tuberculous pleural effusions: increased culture yield with bedside inoculation of pleural fluid and poor diagnostic value of adenosine deaminase. *Thorax* 1991;46:96-9.
89. Shimokata K, Saka H, Murate T, Hasegawa Y, Hasegawa T. Cytokine content in pleural effusion. Comparison between tuberculous and carcinomatous pleurisy. *Chest* 1991;99:1103-7.
90. Gourgoulianis KI. Diagnostic value of adenosine deaminase activity in tuberculous effusions. *Eur Respir J* 1992;3:1098.
91. Nagaraja MV, Ashokan PK, Hande HM. Adenosine deaminase in pleural effusions. *J Assoc Physicians India* 1992;40:157-9.
92. Muranishi H, Nakashima M, Hirano H, Saitoh T, Takahashi H, Tanaka K, et al. Simultaneous measurements of adenosine deaminase activity and tuberculostearic acid in pleural effusions for the diagnosis of tuberculous pleuritis. *Intern Med* 1992;31:752-5.
93. Prasad R, Tripathi RP, Mukerji PK, Singh M, Srivastava VML. Adenosine deaminase activity in pleural fluid – a diagnostic test of tuberculous pleural effusion. *Indian J Chest Dis Allied Sci* 1992;34:123-6

94. Kaur A, Basha A, Ranjan M, Oommen A. Poor diagnostic value of adenosine deaminase in pleural, peritoneal and cerebrospinal fluids in tuberculosis. *Indian J Med Res* 1992;95:270-7
95. De Oliveira HG, Rossatto ER, Prolla JC. Pleural fluid adenosine deaminase and lymphocyte proportion: clinical usefulness in the diagnosis of tuberculosis. *Cytopathology* 1994;5:27-32.
96. Aoki Y, Katoh O, Nakanishi Y, Kuroki S, Yamada H. A comparison study of IFN-g, ADA, and CA125 as the diagnostic parameters in tuberculous pleuritis. *Respir Med* 1994;88:139-43.
97. Ungerer JPJ, Oosthuizen HM, Retief J, Bissbort SH. Significance of adenosine deaminase activity and its isoenzymes in tuberculous effusions. *Chest* 1994;106:33-7.
98. Chiang CS, Chiang CD, Lin JW, Huang PL, Chu JJ. Neopterin, soluble interleukin-2 receptor and adenosine deaminase levels in pleural effusions. *Respiration* 1994;61:150-54.
99. Shibagaki T, Hasegawa Y, Saito H, Yamori S, Shimokata K. Adenosine deaminase isozymes in tuberculous pleural effusion. *J Lab Clin Med* 1996;127:348-52.
100. Orphanidou D, Gaga M, Rasidakis A, Dimakou K, Toumbis M, Latsi P, et al. Tumour necrosis factor, interleukin-1 and adenosine deaminase in tuberculous pleural effusion. *Respir Med* 1996;90:95-8.

101. Burgess LJ, Maritz F, Le Roux I, Frans Taljaard JJ. Combined use of pleural adenosine deaminase with lymphocyte/neutrophil ratio. Increased specificity for the diagnosis of tuberculous pleuritis. *Chest* 1996;109:414-9.
102. Chalhoub M, Cruz AA, Marcilio C, Netto MB. Value of determining the activity of adenosine deaminase (ADA) in the differential diagnosis of pleural effusions. *Rev Assoc Med Bras.* 1996;42:139-46.
103. Bottini PV, Alves-Cunha FA, Souza MI, Garlipp CR. Lymphocytic pleural effusions: diagnostic application of adenosine deaminase activity. *J Bras Patol.* 1996;32:146-52.
104. Kim YC, Park KO, Bom HS, Lim SC, Park HK, Na HJ, et al. Combining ADA, protein and IFN-g best allows discrimination between tuberculous and malignant pleural effusion. *Korean J Intern Med* 1997;12:225-31.
105. Ogawa K, Koga H, Hirakata K, Tomono K, Tashiro T, Kohno S. Differential diagnosis of tuberculous pleurisy by measurement of cytokine concentrations in pleural effusion. *Tuber Lung Dis* 1997;78:29-34.
106. Kuralay F, Çömlekçi A. Adenosine deaminase activity: to be an useful marker in distinguishing pleural effusions due to malignancy from tuberculosis. *Biochem Soc Trans* 1998;26:163.
107. Riantawan P, Chaowalit P, Wongsangiem M, Rojanaraweewong P. Diagnostic value of pleural fluid adenosine deaminase in tuberculous pleuritis with reference to HIV coinfection and a Bayesian analysis. *Chest* 1999;116:97–103.



108. Ghelani DR, Parikh FS, Hakim AS, Pai-Dhungat JV. Diagnostic significance of immunoglobulins and adenosine deaminase in pleural effusion. *J Assoc Physicians India* 1999;47:787–90.
109. Villegas MV, Labrada LA, Saravia NG. Evaluation of polymerase chain reaction, adenosine deaminase, and interferon-gamma in pleural fluid for the differential diagnosis of pleural tuberculosis. *Chest* 2000;118:1355–64.
110. Gorguner M, Cerci M, Gorguner I. Determination of adenosine deaminase activity and its isoenzymes for diagnosis of pleural effusions. *Respirology* 2000;5:321–4.
111. Lim SC, Jung SI, Kim YC, Park KO. Vascular endothelial growth factor in malignant and tuberculous pleural effusions. *J Korean Med Sci* 2000;15:279–83.
112. Reechaipichitkul W, Kawamatawong T, Teerajetgul Y, Patjanasontorn B. Diagnostic role of pleural fluid adenosine deaminase in tuberculous pleural effusion. *Southeast Asian J Trop Med Public Health* 2001;32:383–9.
113. Yamada Y, Nakamura A, Hosoda M, Kato T, Asano T, Tonegawa K, et al. Cytokines in pleural liquid for diagnosis of tuberculous pleurisy. *Respir Med* 2001;95:577–81.
114. Andriasyan NA, Hairapetian HL, Sargisova YG, Mardanyan SS, Badalyan LT, Khanoyan AS. Activity of adenosine deaminase and its isoforms in pleural fluid in tuberculous pleuritis. *Med Sci Monit* 2002;8:708–12.

115. Aoe K, Hiraki A, Murakami T, Eda R, Maeda T, Sugi K, et al. Diagnostic significance of interferon-gamma in tuberculous pleural effusions. *Chest* 2003;123:740–4.
116. Lima DM, Colares JK, da Fonseca BA. Combined use of the polymerase chain reaction and detection of adenosine deaminase activity on pleural fluid improves the rate of diagnosis of pleural tuberculosis. *Chest* 2003;124:909–14.
117. Tahhan M, Ugurman F, Gozu A, Akkalyoncu B, Samurkasoglu B. Tumour necrosis factor–alpha in comparison to adenosine deaminase in tuberculous pleuritis. *Respiration* 2003;70:270–4.
118. Kaisemann MC, Kritski AL, Pereira MFC, Trajman A. Pleural fluid adenosine deaminase detection for the diagnosis of pleural tuberculosis. *J Bras Pneumol*. 2004;30:549-56.
119. Neves DD, Dias RM, Cunha AJLA, Chibante AMS. Efficiency of clinical, radiological and laboratory testing in the diagnosis of pleural tuberculosis. *J Bras Pneumol* 2004;30:409-16.
120. Poyraz B, Kaya A, Ciledag A, Oktem A, Gönüllü U. Diagnostic significance of gamma-interferon in tuberculous pleurisy. *Tuberk Toraks* 2004;52:211–7.
121. El-Ansary AK, Radwan MA. Evaluation of cytokines in pleural fluid for the differential diagnosis of tuberculous pleurisy. *Biochim Clin* 2005;29:13–20.
122. Gaga M, Papamichalis G, Bakakos P, Latsi P, Samara I, Koulouris NG, et al. Tuberculous effusion: ADA activity correlates with CD4+ cell numbers in the fluid and the pleura. *Respiration* 2005;72:160–5.

123. Moon JW, Chang YS, Kim SK, Kim YS, Lee HM, Kim SK, et al. The clinical utility of polymerase chain reaction for the diagnosis of pleural tuberculosis. *Clin Infect Dis* 2005;41:660–6.
124. Okamoto M, Kawabe T, Iwasaki Y, Hara T, Hashimoto N, Imaizumi K, et al. Evaluation of interferon-gamma, interferon-gamma-inducing cytokines, and interferon-gamma-inducible chemokines in tuberculous pleural effusions. *J Lab Clin Med* 2005;145:88–93.
125. Sharma SK, Banga A. Pleural fluid interferon-gamma and adenosine deaminase levels in tuberculosis pleural effusion: a cost-effectiveness analysis. *J Clin Lab Anal* 2005;19:40–6.
126. Tozkoparan E, Deniz O, Cakir E, Yaman H, Ciftci F, Gumus S, et al. The diagnostic values of serum, pleural fluid and urine neopterin measurements in tuberculous pleurisy. *Int J Tuberc Lung Dis* 2005;9:1040–5.
127. Celik G, Kaya A, Poyraz B, Ciledag A, Elhan AH, Oktem A, et al. Diagnostic value of leptin in tuberculous pleural effusions. *Int J Clin Pract* 2006;60:1437–42.
128. Hassanein K, Hosny H, Mohamed R, El-Moneim WA. Role of adenosine deaminase (ADA) in diagnosis of pulmonary tuberculosis. *Egypt J Bronchol* 2010;4:11-8.
129. Katiyar SK, Sampath A, Bihari S, Mamtani M, Kulkarni H. Using a whole-blood interferon-(gamma) assay to improve diagnosis of tuberculous pleural effusion. *Eur Respir J* 2010;36:679–81.

130. Pandit S, Chaudhuri AD, Datta SB, Dey A, Bhanja P. Role of pleural biopsy in etiological diagnosis of pleural effusion. *Lung India* 2010;27:202–4.

131. Ogata Y, Aoe K, Hiraki A, Murakami K, Kishino D, Chikamori K, et al. Is adenosine deaminase in pleural fluid a useful marker for differentiating tuberculosis from lung cancer or mesothelioma in Japan, a country with intermediate incidence of tuberculosis?. *Acta Med Okayama* 2011;65:259–63.

132. Yildiz PB, Yazar EE, Gorgun D, Secik F, Cakir G. Predictive role of adenosine deaminase for differential diagnosis of tuberculosis and malignant pleural effusion in Turkey. *Asian Pac J Cancer Prev* 2011;12:419–23.

133. Liu YC, Shin-Jung Lee S, Chen YS, Tu HZ, Chen BC, et al. Differential diagnosis of tuberculous and malignant pleurisy using pleural fluid adenosine deaminase and interferon gamma in Taiwan. *J Microbiol Immunol Infect* 2011;44:88–94.

134. Ambade V, Arora MM, Rai SP, Nikumb SK, Basannar DR. Markers for differentiation of tubercular pleural effusion from non-tubercular effusion. *Med J Armed Forces India* 2011;67:338–42.

135. Kalantri Y, Hemvani N, Chitnis DS. Evaluation of real-time polymerase chain reaction, interferon-gamma, adenosine deaminase, and immunoglobulin A for the efficient diagnosis of pleural tuberculosis. *Int J Infect Dis* 2011;15:226–31.

136. Kumar M, Sharma R, Dubey M, Banu N, Sharma S. Mycobacterium tuberculosis detection in pleural effusion by adenosine deaminase assay. *Asian J Microbiol Biotechnol Environ Sci* 2012;14:181–6.

137. Helmy NA, Eissa SA, Masoud HH, Elessawy AF, Ahmed RI. Diagnostic value of adenosine deaminase in tuberculous and malignant pleural effusion. *Egypt J Chest Dis Tuberc* 2012;61:413-7
138. Khan FY, Hamza M, Omran AH, Saleh M, Lingawi M, Alnagdy A, et al. Diagnostic value of pleural fluid interferon-gamma and adenosine deaminase in patients with pleural tuberculosis in Qatar. *Int J Gen Med* 2013;6:13–8.
139. Keng LT, Shu CC, Chen JY, Liang SK, Lin CK, Chang LY, et al. Evaluating pleural ADA, ADA2, IFN- $\gamma$  and IGRA for diagnosing tuberculous pleurisy. *J Infect* 2013;67:294-302.
140. Sethi S, Kaur J, Yadav R, Dhatwalia SK, Mewara A, Rana S, et al. Combination of adenosine-deaminase and nucleic acid amplification assays for diagnosing tuberculous pleural effusion. *J Infect* 2014;69:99–101.
141. Shah PC, Shah CP, Dighe MP, Dalal PC. Role of adenosine deaminase in diagnosis of tuberculous pleural effusion. *Int J Med Sci Public Health* 2014;3:1051–5.
142. Kumar S, Agarwal R, Bal A, Sharma K, Singh N, Aggarwal AN, et al. Utility of adenosine deaminase (ADA), PCR and thoracoscopy in differentiating tuberculous and non-tuberculous pleural effusion complicating chronic kidney disease. *Indian J Med Res* 2015;141:308–14.