

Diagnostic Accuracy of Xpert Mtb/Rif Assay in Stool Samples in Intrathoracic Childhood Tuberculosis

Saba Samad Memon¹, Sanjeev Sinha^{1*}, SK Sharma¹, SK Kabra², Rakesh Lodha² and Manish Soneja¹

*Corresponding author: Sanjeev Sinha, Department of Medicine, AIIMS, New Delhi, P.O. Box 110029, India, Tel: +919810164416, 011-26594440; Fax: 011-26588918; E-mail: drsanjeevsinha@gmail.com

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Abstract

Background: The study aims at finding out usefulness of Xpert in stool samples in children, as they swallow their sputum. It also simultaneously compares the results of stool Xpert with Xpert, smear and gastric lavage and sputum samples.

Materials and methods: A diagnostic accuracy study included children (<15 years) with probable intrathoracic tuberculosis. Induced sputum, gastric aspirate and stool samples each were subjected to Xpert, AFB stain and culture. Diagnostic utility of stool Xpert was calculated with reference to liquid culture in sputum or gastric aspirate.

Results: The study included 100 children. Stool Xpert was positive in 4 cases (4%). Overall diagnostic yield was 26%. The total yield including culture and Xpert (sputum or gastric aspirate) was 45%. The sensitivity of stool Xpert was 11.54% and specificity 98.65% as compared to culture. There was association of stool Xpert with sputum AFB (p 0.024), sputum Xpert (p 0.004) and gastric aspirate Xpert (p 0.039), while there was no significant association with X-ray pattern or malnutrition.

Conclusion: Stool sample for Xpert cannot replace gastric aspirate and induced sputum for diagnosis, hence should not be used as a first line test.

cVgf i Wjcb' cf' gLi fuHcb' cZ 0- & ' cb' fcca' Uf' T Y gi Xnk Ug dUfjWg' lc' gthY' T Y g dYfbUlbh kUg hYb' dfcWgX Vm Udffcj YXVmjbgjhi hcbU'Yh]WVa a]hYf5=A Gz8Y\J'

DUjYbldfYgjbh]b] k]h Zj Yf'2' ,.7 Zf'a cfYhUb'cbYk YY_ZWi [\ Zf'a cfYhUb' &kYY_g'cf' Wbg]h hcbU' gra drea gk\]W dYfgdX Uf Yf' hYUa Ybhk]h' Ub]Vch]Wk YfYg VYWXlc' WghfU]c]fUd' "-Z hY fUXc]fUd' g'ck YX ZUhfYg Wbg]h]b] k]h']bhU]hcfUWV hi VYfW'cg]g'[_Y\]Uf'cf'a YX]U]bU`na d\UXbcdU]h]Wbg'X]h]cbz Wj]h]a]]Ufm dU]h]b' cf' d'Yi fU' Yf i gcb' Ug' 1 X]YX Vm Y dYfh dUX]Uf]W]b'UbXh YdU]Ybh\UX]h Yf d'cg]h] Yh VYfW]b'g']b'h]g]f] %\$'a a]bXi fu]cb]c'f\]g'cfmcZ]Wb]U]b' U]h]i&m]Ufgk]h' U]W]g]cZ hi VYfW'cg]g'h YW]Xk Ug'UY'YX]Ug'dfcVU]Yhi VYfW'cg]g'9l W'g]cb W]h]f]U'k YfY U]d]YX lc' h'Yg' W]g]z UbX Wbg]h]k Ug' hU'Yb" T Yf W]b]W' d'fc' Yk Ug'fY]k YX UbX X]U]g'cZ d'ng]W' Y] U]a]b]U]cb' UbX bi h]h]cbU' g]U]h' g'k YfY fYf'X]X" T Y W]X]Yb' k YfY h'Yb' Ug' YX lc' f'd'cfh Zf' W' Y]cb' cZ [U]f]W]U] U]Y UbX]bXi W]X gli h]a 'cb']k'c Wbg]W]h] YX]Ug'UbX V]b]]g'cc' g]a d'Yg'k\Yb' h'Ym]Wa Y' b' W]g]cZ XYU]h]b' V]b]]b]]g'cc' g]a d'Yg]h' Ynk YfY Ug' YXlc' fY]f] YfU]h' Yg'cc' g]a d'Y' ; U]f]W]U]f]U]Y' UbX]bXi W]X gli h]a 'k YfY W' Y]WX Vm dUX]Uf]W]U]g' Ug' d'Yf' g]UbX]fX d'f'c'W' 0%Q Gdi h]a ']bXi W]cb' k Ug' XcbYcb'm]Z]l d'Y]f]U]cb' k Ug'bchdc]g]VY'

Laboratory processing

DUjYXg]a d'Yg'k YfY W' Y]WXZca' U' dU]Yb]g]cb Wbg]W]h] YX]Ug' Y]W]h]Zf' g'cc' f'fb'm]U]g]b] Y]g'cc' g]a d'Yk Ug' W' Y]WX' T Yg'k YfY dcc' YX VZ'fY d'fcW]g]b] " 5 " h'Y g]a d'Yg'k YfY g' VYWXlc' LdYf]z gli h]a ' UbX [U]f]W]U] U]Yk YfY g' VYWXlc' g]a Yf' a]W]c]g]W]d]m]UbX]ei]XW]h' fYf]A; =H]zk\]Y]g'cc' k Ug'W]h' fYXcb' @ck Yb]g]b] >Yb]g]b' f]e]L' a Y]Xi a " T Y gli h]a ' UbX [U]f]W] U]U]Y g]a d'Yg'k YfY X]W]b]h]a]b]U]X' k]h' B5@7!BUC<' a Y]h'cX d'f]c'f' lc' g]a Yf' UbX W]h' fY' G]UbX]fX d'f'c'W' g'Z'f' g]a Yf]z W]h' fYUbX]Ld'Yf]h]k YfY Z' `ck YX 0&2% Q

5Vci h8SS'a ['cZ]g'cc' k Ug' \ca c] Yb]g]X]b' %a @D'c]g]l\U]Y]Bi f Yf g]U]b]Y]f]d]6E' =h]k Ug' h'Yb' Yf' Z'f' g]ca Y]h]a Y]lc' U'ck' h'Yi b]X]g]c]j YX

| | |
|-------------------|------------------|
| | Consolidation-11 |
| | Cavity-7 |
| | Effusion-9 |
| | Miliary-6 |
| | Others-2 |
| HIV status | Positive-3 |
| | Negative-3 |
| | Not done-94 |

HIV%6Uy]bYWUfUMf]g]WcZYbfc`YxdU]Ybg`

| | Total | Positive | Negative | Indeterminate/Contaminated |
|-------------------------|-------|----------|----------|----------------------------|
| Xpert | | | | |
| Stool | 100 | 4 | 94 | 2 |
| Sputum | 100 | 27 | 72 | 1 |
| Gastric aspirate | 100 | 37 | 62 | 1 |
| Culture | | | | |
| Stool | 64 | 0 | 62 | 2 |
| Sputum | 99 | 18 | 77 | 4 |
| Gastric aspirate | 100 | 25 | 73 | 2 |
| Smear microscopy | | | | |
| Sputum | 100 | 7 | 93 | |
| Gastric aspirate | 100 | 6 | 94 | |

HIVY&FYg]gcZa]McV]c]c[]W]hg]b]hYgiXmcdi`U]cb`

| | Sensitivity | Specificity | PPV | NPV |
|-------------------------------|----------------|----------------|----------------|----------------|
| Stool Xpert | 11.54% | 98.65% | 75.00% | 76.04% |
| | (2.45-30.15%) | (92.70-99.97%) | (24.60-96.50%) | (73.37-78.52%) |
| Sputum Xpert | 73.08% | 89.19% | 70.37% | 90.41% |
| | (52.21-88.43%) | (79.80-95.22%) | (54.25-82.63%) | (83.28-94.69%) |
| Gastric aspirate Xpert | 76.92% | 77.03% | 54.05% | 90.48% |
| | (56.35-91.03%) | (65.79-86.01%) | (42.44-65.25%) | (82.33-95.09%) |

PPV-positive predictive value, NPV-negative predictive value, MGIT-Mycobacterial Growth Indicator tube (Liquid culture)

HIVY` .8]U]bcg]j]WUWfUMcZLdYfhngk]h]fYZfW]c`A;`-Hdcg]h]m]b]g]i]h]a`cf[]U]f]W]g]d]f]U]Y`

Gcc`LdYfhkUgdcg]h]Y]b` (W]g]z]b]Y]U]j]Y]b` (UbX]b]X]M]f]a]]b]U]Y]b` & W]g]g]f]H]V]Y`&L`C]Z]h]Y]g]Z`%k]U]g]F]Z]a]d]M]b`f]f]Z]]b]X]M]f]a]]b]U]Y UbX]c]h]Y` F]Z]g]b]g]h]j]Y`Gcc`LdYfhkUgdcg]h]Y]b` #&`f]f]%)` 1`E]c]Z dU]Y]b]g]k]h]`W]h]f]Y]d]c]g]h]]m]k]`Y]b`%#`(`f]f]` 1`E]U]a]c]b]`d]U]Y]b]g]k]h]`b]Y]U]j]Y]W]h]f]Y`T`Y]g]b]g]h]]h]g]d]W]W]y]`d]c]g]h]Y]U]b]X]b]Y]U]j]Y d]f]X]W]j]Y]j]U]i]Y]c]Z]g]c`LdYfhk`Y]b`F` j]U]i]h]n`

Vfk Yb' gce` LdYh dcglj l mUx L! fUndUmz 67; `j UWUcb

dcglhj YV hLdYfhbY[Uhj YUbXbY[Uhj Ycf WbHá]bUXW/h fYWi X
fYfYgYbY]h Yf WbHá]bUXgá d'Ycf bcb!h VfwUf a nWVUMf]U

T Y VUMf]c[c[]W' n]YX]b' chYf' gi X]Yg' 0%Q i g U'm fUb[Yg
VfkYb' & 'le" S' "T Y]bW gcb' cZLdYfh' YUX'le' h']g]bW]g]Xn]YX'
Cj YfU' LdYfhX]W]X%cb' & 'W/h fYdcglhj YW]g]f S'+1 E]ZUbX%
cZW/h fYbY[Uhj YW]g]h' g'a U_]b['dfcj]b[']hlc' VYj Yfmi gZ']b
X]U]bcg]g'cZW]X'ccXh Vfw'c]g]T Ydcg]VYfY]c]bgk\m[U]f]W
U]g]f]U]LdYfh'Yg']g]g' dYg]XXXW/h fYWi X'VYU]h]Wb' X]W]Y] Yb
ZkYf' VU]V' V]b['Ua c'W'Uf' h]g]i]UbX'h]U]Y] Yb' X]UX'VU]V' Wb' VY
d]W]X]i d'V]LdYfh]h]g]b["5bch' Yf' dcg]VY]d' U]b]cb' Wi' X'VY]h]U]h
d]f]cf'le' W'h fZ]h]Yg]á d'Yg]k' YfYg' V]W]X]lc' X]W]b]Há]b]U]cb]z]k\]Y
LdYfh]g]á d'Yg]f]m] W]h]g]cc' k'Yf]bcl'E'T]g]Wi' X\]Y'Y'X]lc' k]U]g]]b[