Résultats positifs d'un test syndromique: Quoi faire en pratique?

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Syndro-quoi?

- La Promesse du test syndromique

  Présentation clinique -> 1 test simple et rapide -> diagnostic positif

- Quel Syndrome?
  - Méningo-encéphalite
  - Diarrhée
  - Infection respiratoire
    - haute
    - Basse

Une offre pilotée par l'industrie

- Multiplex « low-plex »
- Multiplex « high-plex »
- Multiplex « con-plex »: les dessous de l'industrie





La pneumopathie, indication phare du syndromique

Les offres « low-plex »

- Panels virologiques
  - VRS
  - Grippe
  - Grippe A/B/H1N1
  - Parainfluenzae virus
  - Parainfluenzae virus 1, 2, 3
  - Metapneumovirus
- Panels bactériens: -> Atypiques
  - *Chlamidophila pneumoniae*
  - *Mycoplasma pneumoniae*
  - *Bordetella (pertussis/parapertussis*
  - *Legionella pneumophila*

Les offres « high-plex »

Adénovirus
Coronavirus HKU1
Coronavirus NL63
Coronavirus 229E
Coronavirus OC43
Métapneumovirus humain
Rhinovirus humain/Entérovirus
Virus de la grippe A
Virus de la grippe A/H1
Virus de la grippe A/H1-2009
Virus de la grippe A/H3
Virus de la grippe B
Virus parainfluenza 1
Virus parainfluenza 2
Virus parainfluenza 3
Virus parainfluenza 4
Virus respiratoire syncytial
Coronavirus du syndrome respiratoire du Moyen-Orient (Mers-Cov)

Bordetella pertussis (ptxP)
Chlamydophila pneumoniae
Mycoplasma pneumoniae
Bordetella parapertussis (IS1001)

Adenovirus
Coronavirus 229E
Coronavirus HKU1
Coronavirus NL63
Coronavirus OC43
Middle East Respiratory Syndrome Coronavirus (MERS-CoV)
Human Bocavirus
Human Metapneumovirus
Human Rhinovirus/Enterovirus
Influenza A
Influenza A H1
Influenza A H1-2009
Influenza A H3
Influenza B
Parainfluenza 1
Parainfluenza 2
Parainfluenza 3
Parainfluenza 4
Respiratory Syncytial Virus A
Respiratory Syncytial Virus B

Bordetella pertussis
Chlamydia pneumoniae
Legionella pneumophila
Mycoplasma pneumoniae

Adenovirus
Bocavirus
Coronavirus 229E
Coronavirus HKU1
Coronavirus NL63
Coronavirus OC43
human Metapneumovirus A/B
Influenza A
Influenza A subtype H1N1/2009
Influenza A subtype H1
Influenza A subtype H3
Influenza B
Parainfluenza virus 1
Parainfluenza virus 2
Parainfluenza virus 3
Parainfluenza virus 4
Respiratory Syncytial virus A/B
Rhinovirus/Enterovirus

Bordetella pertussis
Legionella pneumophila
Mycoplasma pneumoniae

Qui prescrit quoi/quand

- Quel test est réalisé?
- Qui a décidé?
- Quel contexte?
- Quel objectif?

Interprétation

- Sensibilité/spécificité – VPP/VPN
- Pathogènes stricts/portage asymptomatique?
- Co-infection
- Quantification?

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VIROLOGY

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Impact of Rapid Molecular Diagnostic Testing of Respiratory Viruses on Outcomes of Adults Hospitalized with Respiratory Illness: a Multicenter Quasi-experimental Study

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ABSTRACT A standard multiplex PCR offers comprehensive testing for respiratory viruses. However, it has traditionally been performed in a referral laboratory with a lengthy turnaround time, which can reduce patient flow through the hospital. We aimed to determine whether the introduction of a rapid PCR, but with limited targets (Cepheid Xpert Flu/RSV XC), was associated with improved outcomes for adults hospitalized with respiratory illness. A controlled quasi-experimental study was conducted across three hospitals in New South Wales, Australia. Intervention groups received standard multiplex PCR during the preimplementation, July to December 2016 ($n = 953$), and rapid PCR during the postimplementation, July to December 2017 ($n = 1,209$). Control groups (preimplementation, $n = 937$, and postimplementation, $n = 1,102$) were randomly selected from adults hospitalized with respiratory illness during the same periods. The outcomes were hospital length of stay (LOS) and microbiology test utilization (blood culture, urine culture, sputum culture, and respiratory bacterial and virus serologies). The introduction of rapid PCR was associated with a nonsignificant 8.9-h reduction in median LOS (95% confidence interval [CI], −21.5 h to 3.7 h; $P = 0.17$) for all patients and a significant 21.5-h reduction in median LOS (95% CI, −36.8 h to −6.2 h; $P < 0.01$) among patients with positive test results in an adjusted difference-in-differences analysis. For patients receiving test results before disposition, rapid PCR use was associated with a significant reduction in LOS, irrespective of test results. Compared with standard PCR testing, rapid PCR use was significantly associated with fewer blood culture (adjusted odds ratio [aOR], 0.67; 95% CI, 0.5 to 0.82; $P < 0.001$), sputum culture (aOR, 0.56; 95% CI, 0.47 to 0.68, $P < 0.001$), bacterial serology (aOR, 0.44; 95% CI, 0.35 to 0.55, $P < 0.001$) and viral serology (aOR, 0.42; 95% CI, 0.33 to 0.53, $P < 0.001$) tests, but not with fewer urine culture tests (aOR, 0.94; 95% CI, 0.78 to 1.12, $P = 0.48$). Rapid PCR testing of adults hospitalized with respiratory illnesses can deliver benefits to patients and reduce resource utilization. Future research should consider a formal economic analysis and assess its potential impacts on clinical decision making.

Low plex vs High plex

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Impact of point-of-care testing for respiratory viruses on antibiotic use in adults with exacerbation of airways disease

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SUMMARY

Background: The ResPOC study demonstrated that syndromic molecular point-of-care testing (POCT) for respiratory viruses was associated with early discontinuation of unnecessary antibiotics compared to routine clinical care. Subgroup analysis suggests these changes occur predominantly in patients with exacerbation of airways disease. Use of molecular POCT for respiratory viruses is becoming widespread but there is a lack of evidence to inform the choice between multiplex syndromic panels versus POCT for influenza only.

Materials/methods: We evaluated patients from the ResPOC study with exacerbation of asthma or COPD who were treated with antibiotics. The duration of antibiotics and proportion with early discontinuation were compared between patients testing positive and negative for viruses by POCT, and controls. Patients testing positive for viruses by POCT were compared according to virus types.

Results: 118 patient with exacerbation of airways disease received antibiotics in the POCT group and 111 in the control group. In the POCT group 49/118 (42%) patients tested positive for viruses. Of those testing positive for viruses 17/49 (35%) had early discontinuation of antibiotics versus 9/69 (13%) testing negative and 7/111 (6%) of controls, $p<0.0001$. Of those positive for viruses by POCT 10/49 (20%) were positive for influenza, 21/49 (43%) for rhinovirus and 18/49 (37%) for other viruses. The proportion with early discontinuation of antibiotics was not different between the virus types ($p=0.34$).

Conclusions: This data suggests that syndromic molecular POCT for respiratory viruses should be favoured over POCT for influenza alone in adults with exacerbation of airways disease.

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Impact of multiplex molecular assay turn-around-time on antibiotic utilization and clinical management of hospitalized children with acute respiratory tract infections

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ABSTRACT

Background: Empiric antibiotic treatment is common among children with acute respiratory tract infections (ARTI), despite infections being predominately viral. The use of molecular respiratory panel assays has become increasingly common for medical care of patients with ARTIs.

Study design: This was a 6-year retrospective, single-centered study of pediatric inpatients who tested positive for an ARTI respiratory pathogen. We examined the relationship between clinical outcomes and whether the patient was tested using the Luminex Respiratory Viral Panel ([RVP]; in-use: Dec. 2009 – Jul. 2012) or Biofire Respiratory Pathogen Panel ([RP]; in-use Aug. 2012 – Jun. 2016). The prevalence and duration of pre-test empiric antibiotics, post-test oseltamivir administration to influenza patients, chest x-rays and length of stay between the two assays was compared.

Results: A total of 5142 patients (1264 RVP; 3878 RP) were included. The median laboratory turn-around-time for RP was significantly shorter than RVP (1.4 vs. 27.1 h, respectively; $p < .001$). Patients tested with RP were less likely to receive empiric antibiotics (OR: 0.45; $p < .001$; 95% CI: 0.39, 0.52) and had a shorter duration of empiric broad-spectrum antibiotics (6.4 h vs. 32.9 h; $p < .001$) compared to RVP patients. RP influenza patients had increased oseltamivir use post- test compared to RVP influenza patients (OR: 13.56; $p < .001$; 95% CI: 7.29, 25.20).

Conclusions: Rapid molecular testing positively impacts patient management of ARTIs. Adopting assays with a shorter turn-around-time improves decision making by decreasing empirical antibiotic use and duration, decreasing chest x-rays, increasing timely oseltamivir administration, and reducing length of stay.

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Original article

Accuracy of comprehensive PCR analysis of nasopharyngeal and oropharyngeal swabs for CT-scan-confirmed pneumonia in elderly patients: a prospective cohort study

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Objectives: We aimed to assess the accuracy of PCR detection of viruses and bacteria on nasopharyngeal and oropharyngeal swabs (NPS) for the diagnosis of pneumonia in elderly individuals.
Methods: We included consecutive hospitalized elderly individuals suspected of having pneumonia. At inclusion, NPS were collected from all participants and tested by PCR for the presence of viral and bacterial respiratory pathogens (index test, defined as comprehensive molecular testing). Routine diagnostic tests (blood and sputum culture, urine antigen detection) were also performed. The reference standard was the presence of pneumonia on a low-dose CT scan as assessed by two independent expert radiologists.
Results: The diagnosis of pneumonia was confirmed in 127 of 199 (64%) included patients (mean age 83 years, community-acquired pneumonia in 105 (83%)). A pathogen was identified by comprehensive molecular testing in 114 patients (57%) and by routine methods in 22 (11%). Comprehensive molecular testing was positive for viruses in 62 patients (31%) and for bacteria in 73 (37%). The sensitivity and specificity were 61% (95% CI 53%–69%) and 50% (95% CI 39%–61%) for comprehensive molecular testing, and 14% (95% CI 82%–21%) and 94% (95% CI 86%–98%) for routine testing, respectively. Positive likelihood ratio was 2.55 for routine methods and 1.23 for comprehensive molecular testing.
Conclusion: Comprehensive molecular testing of NPS increases the number of pathogens detected compared with routine methods, but results are poorly predictive of the presence of pneumonia. Hence, comprehensive molecular testing is unlikely to impact clinical decision-making (NCT02467192).

ORIGINAL STUDIES

Multiplex Polymerase Chain Reaction Panel for Suspected Pertussis

What About a Positive Mycoplasma pneumoniae Result?

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Background: The use of bacterial multiplex polymerase chain reaction (PCR) in children with suspected pertussis sometimes yields unexpected positive results for *Mycoplasma pneumoniae*. We aimed to evaluate the clinical significance of positive *M. pneumoniae* results in this population.

Methods: Retrospective cohort of consecutive patients with suspected pertussis tested with a bacterial multiplex PCR (including *Bordetella pertussis* and *M. pneumoniae*) between June 2015 and March 2017. Medical records were reviewed to compare demographics, clinical presentations and outcomes of patients positive for *M. pneumoniae* with those positive for *B. pertussis* and those with negative results, using multivariable logistic regression.

Results: A total of 1244 patients were included as follows: 56 (4.5%) with *M. pneumoniae*, 116 (9.3%) with *B. pertussis* and 1029 (82.7%) with negative results. Mean age was respectively 4.8 years, 6.5 years and 2.8 years ($P < 0.05$). Children with *M. pneumoniae* were less likely to present with cardinal symptoms of pertussis such as paroxysmal cough [adjusted odds ratio (OR): 0.19, 95% confidence interval (CI): 0.08–0.40) but were more likely to have fever (adjusted OR: 10.53, 95% CI: 3.54–39.49) and other nonspecific respiratory symptoms compared with children with *B. pertussis*. Children with *M. pneumoniae* had very similar clinical presentations to those with a negative PCR, but were more likely to have radiologically confirmed pneumonia (adjusted OR: 5.48, 95% CI: 2.96–9.99) and were less likely to be diagnosed with a concomitant viral infection (adjusted OR: 0.32, 95% CI: 0.07–0.99).

Conclusions: In children with suspected pertussis, the detection of *M. pneumoniae* is clinically relevant. However, the impact of this finding on patients' outcome is still unclear.