

ORIGINAL PAPER
ΕΡΕΥΝΗΤΙΚΗ ΕΡΓΑΣΙΑ

Cost-effectiveness analysis for basic screening tests for swine flu in a pandemic

OBJECTIVE Currently, many screening tests for swine flu are available. A major concern is the cost-effectiveness of the test used. Here a basic cost-effectiveness analysis is made of the available basic screening tests for swine flu in the pandemic situation. **METHOD** This investigation was designed as a standard cost-effectiveness study of the five tests available in Thailand. **RESULTS** According to this study, the cost-effectiveness per turnaround time of the rapid test is the lowest alternative. **CONCLUSIONS** Based on a cost-effectiveness analysis, the rapid test appeared to be the most appropriate screening test for swine flu.

Emerging infectious disease is an important public health episode that affects a large number of populations around the world. The most recent emerging infectious disease is the still present global public health problem of "swine flu".¹ This disease is a form of viral respiratory tract infection with a wide range of clinical manifestations ranging from mild to severe signs and symptoms, culminating, in the worst case, in death from respiratory failure.

To date, more than one million cases have been accumulated in registry data since its first appearance in 2009, and it is accepted as a pandemic.² Although vaccine and antiviral drugs are available the disease is still not under control. A major problem in the management of this disease is diagnosis. Early diagnosis and prompt management can help to reduce the complications of the infection.^{3,4}

For definitive diagnosis of the infection, molecular based diagnosis has to be performed. This is not available in all clinical settings, but a variety of screening tests for swine flu are available. In this context, a major concern is the cost-effectiveness of the test to be used. Here, a basic cost-effectiveness analysis made of the basic screening tests for swine flu available in the pandemic situation in Thailand is presented.

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V. Wiwanitkit

Wiwanitkit House, Bangkhae, Bangkok, Thailand

Ανάλυση κόστους-αποτελεσματικότητας για τις βασικές αδρές εξετάσεις ανίχνευσης της γρίπης των χοίρων σε πανδημία

Περίληψη στο τέλος του άρθρου

Key words

Cost
Effectiveness
Screening
Swine flu
Test

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MATERIAL AND METHOD

This investigation was designed as a medical economics study. The main aim of the study was to compare the cost-effectiveness of the basic screening tests for swine flu. Data on the cost and the effectiveness of the each basic screening method were reviewed, using Thailand as a representative setting.⁴ Thailand is a tropical country that is currently affected by the problem of pandemic swine flu.

The basic screening tests for swine flu in this study included the five tests available in Thailand: (a) Rapid test, (b) PCR test, (c) real time PCR test, (d) pyrosequencing test, and (e) fluorescence-biosensor test (available at: <http://www.nstda.or.th/eid/download/news/22-2.pdf>). "Cost" in this study was defined as unit cost reported by the laboratory of the hospital and was presented in baht (tab. 1). The utility or "effectiveness" was derived from reported sensitivity and turnaround in screening of each basic screening test. The "cost-effectiveness" in this study was defined as cost per effectiveness per turnaround time.

RESULTS

The cost, utility and turnaround time of each basic screening method for swine flu are shown in table 1. The cost-effectiveness of each basic screening method is presented

Table 1. Cost, effectiveness and turnaround time of each basic screening test for swine flu.

Test	Cost (US \$)	Utility (%)	Turnaround time (minutes)
Rapid test	10	50	15
PCR test	13	100	420
Real time PCR test	16	100	240
Pyrosequencing test	16	100	240
Fluorescence-biosensor test	11	100	60

Table 2. Cost-effectiveness of each basic screening test for swine flu.

Test	Cost-effectiveness (US \$/min)
Rapid test	10
PCR test	13
Real time PCR test	16
Pyrosequencing test	16
Fluorescence-biosensor test	11

in table 2. According to this cost-effectiveness evaluation, the rapid test is the most cost effective option.

DISCUSSION

Swine flu is currently an important pandemic disease, but it can be underdiagnosed because it may be confused with other common febrile diseases.⁷ The most accurate diagnosis of swine flu is based on the determination of ge-

netic content by molecular based techniques, which might take a very long waiting time and is therefore of limited use in everyday clinical practice. For this reason, the gold standard for diagnosis based on molecular based methods has to be rethought for its actual clinical usefulness.

During the pandemic, several screening tests have been introduced for routine use, ranging from the simple rapid test (strip test) to special molecular based testing. Due to the present economic crisis in Thailand and other tropical countries, however, not only the diagnostic sensitivity but also the cost-effectiveness of all screening tests must be considered. In some developed settings, the real time PCR test might be included as a cost effective option,⁵ but this needs to be validated in resource limited settings.

According to this cost-effectiveness evaluation of the tests available in Thailand, the overall cost-effectiveness of the rapid test is the lowest. When the turnaround time is not taken into analysis, this test appears to be inferior to other tests, and the fluorescence-biosensor test appears to be the best. However, as having the earliest accurate diagnosis is the key to success in the control of a pandemic, the rapid test gave the overall most satisfactory result.⁴

In conclusion, a cost-effectiveness study performed to compare several basic screening tests in the rapid diagnosis of swine flu showed the rapid test to be the most cost effective.

CONFLICT OF INTEREST

None.

ΠΕΡΙΛΗΨΗ

Ανάλυση κόστους-αποτελεσματικότητας για τις βασικές αδρές εξετάσεις ανίχνευσης της γρίπης των χοίρων σε πανδημία

V. WIWANITKIT

Wiwanitkit House, Bangkhae, Bangkok 10160, Ταϊλάνδη

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ΣΚΟΠΟΣ Σήμερα, είναι διαθέσιμες αρκετές δοκιμασίες ανίχνευσης για τη γρίπη των χοίρων. Έτσι, ενδιαφέρον προκαλεί η αξιολόγηση της αποτελεσματικότητάς τους ανάλογα με το κόστος, ιδιαίτερα σε περιόδους πανδημίας. **ΥΛΙΚΟ-ΜΕΘΟΔΟΣ** Έγινε μια συνήθης μελέτη κόστους-αποτελεσματικότητας, αξιολογώντας τις 5 διαθέσιμες δοκιμασίες στην Ταϊλάνδη. **ΑΠΟΤΕΛΕΣΜΑΤΑ** Το κόστος ανάλογα με την αποτελεσματικότητα και τον απαιτούμενο χρόνο τέλεσης μιας ταχείας εξέτασης ανίχνευσης αποτελούν τις δύο χαμηλότερες εναλλακτικές παραμέτρους. **ΣΥΜΠΕΡΑΣΜΑΤΑ** Η ταχεία εξέταση ανίχνευσης είναι η καταλληλότερη για αδρή αναζήτηση της νόσου.

Λέξεις ευρητήριο: Αποτελεσματικότητα, Γρίπη χοίρων, Εξέταση ανίχνευσης, Κόστος

References

1. WIWANITKIT V. Swine flu: The present pandemic infectious disease. *Kulak Burun Bogaz Ihtis Derg* 2009, 19:57–61
2. GIRAD MP, TAM JS, ASSOSSOU OM, KIENY MP. The 2009 A (H1N1) influenza virus pandemic: A review. *Vaccine* 2010, 28:4895–4902
3. CUNHA BA, PHEREZ FM, STROLLO S. Swine influenza (H1N1): Diagnostic dilemmas early in the pandemic. *Scand J Infect Dis* 2009, 41:900–902
4. WIWANITKIT V. Antiviral drug treatment for emerging swine flu. *Clin Ter* 2009, 160:243–245
5. NINOVE L, GAZIN C, GOULD EA, NOUGAIREDE A, FLAHAULT A, CHARREL RN ET AL. A simple method for molecular detection of swine-origin and human-origin influenza A virus. *Vector Borne Zoonotic Dis* 2010, 10:237–240

Corresponding author:

V. Wiwanitkit, Wiwanitkit House, Bangkhuae, Bangkok 10160, Thailand
e-mail: wviroj@yahoo.com

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