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Improvement in Patient Management through the Use of a *Clostridium difficile* PCR Real Time Stand Alone Test in Acute Hospital Setting

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Abstract

Background

Currently the management of *C.difficile* infected patients represents a high cost for the hospital budget in term of increasing patient length of stay, isolation of positive cases and specific decontamination procedures. The aim of this study is to assess the changes in patient management and Hospital costs after the implementation of a molecular test for the rapid diagnosis of *C.difficile* Infection (CDI).

Methods

In December 2011 the Xpert *C. difficile* test on the GeneXpert Platform (Cepheid, CA) was implemented as PCR Real Time stand alone test to replace the diagnostic algorithm in use (EIA Toxin A/B, Techlab VA). Unformed stool specimens (n°=198) of suspected positive patients collected in January-March 2012 were tested. We compared the two different diagnostic strategies during 2010, 2011 and the first quarter of 2012 (making a prospective simulation) in terms of in-lab and out-lab costs.

Results

We observed increasing in-lab costs with a reduction in the number of tests performed by patients due to a decreasing in test repetition rate (tab.1). We noted a cost reduction in antibiotic treatment and in decreasing of isolation days (13 versus 18 and 25 in 2010 and 2011 respectively). The data highlighted in the first quarter suggest a decreasing in the overall costs of hospitalization compared with the two previous years (tab.1), the reduction of isolation days would lead to savings of up to € 15,583 for every positive suspected patient.

Conclusions

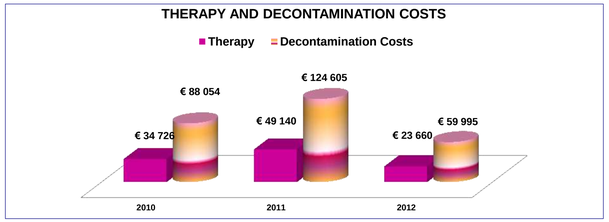
1) The routine use of the Xpert *C. difficile* test reduces the number of repeated tests necessary to obtain CDI diagnosis for a rapid and a better treatment of the patient;
2) The end results is a general overall saving of Hospitalization costs despite the fact that the costs of PCR testing per samples are higher than the method used in the previous years.

Background

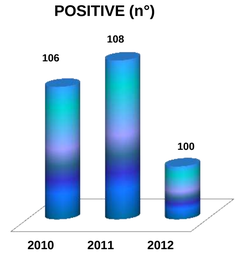
Clostridium difficile is the first cause of nosocomial diarrhea (1). Currently the management of *C.difficile* infected patients represents a high cost for the hospital budget in term of increasing patient length of stay (LOS), isolation of positive cases and specific decontamination procedures (2). The aim of this study is to assess the changes in patient management and Hospital costs after the implementation of a new molecular test for the rapid diagnosis of *C.difficile* Infection (CDI).

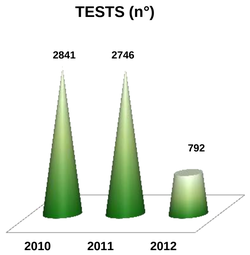
Materials & Methods

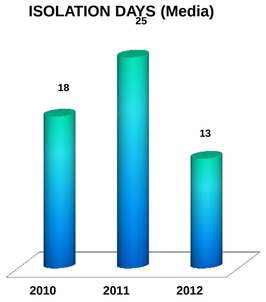
In December 2011 the Xpert *C. difficile* test on the GeneXpert Platform (Cepheid, CA) was implemented as PCR Real Time stand alone test to replace the diagnostic algorithm in use (EIA Toxin A/B, Techlab VA). Xpert *C.difficile* detects the toxin B gene (*tcdB*), the binary toxin (*cdt)*, and a deletion in regulatory gene (*tcdC)* associated with the 027/NAP1/BI strain. The TAT (Turn Around Time) of the total process is 45 minutes. Unformed stool specimens (n° =198) of suspected positive patients collected in January-March 2012 were tested with the new diagnostic system. We compared the two different diagnostic strategies to identify CDI during 2010, 2011 and the first quarter of 2012 (making a prospective simulation) in terms of in-lab and out-lab costs (special decontamination and isolation procedures and general hospitalization costs).

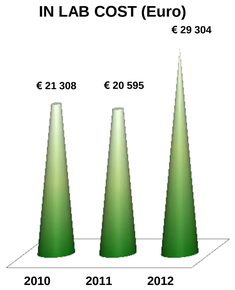


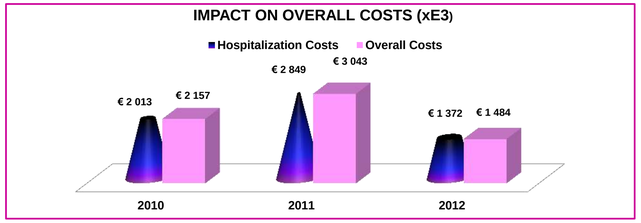
Results











Summary

We observed increasing in-lab costs with a reduction in the number of tests performed by patients due to a decreasing in test repetition rate (tab.1). We noted a cost reduction in antibiotic treatment and in decreasing of isolation days (13 versus 18 and 25 in 2010 and 2011 respectively). The data highlighted in the first quarter suggest a decreasing in the overall costs of hospitalization compared with the two previous years (tab.1), the reduction of isolation days would lead to savings of up to € 15,583 for every positive suspected patient

Conclusions

1) The routine use of the Xpert *C. difficile* test reduces the number of repeated tests necessary to obtain CDI diagnosis for a rapid and a better treatment of the patient (tab.1);
2)The high sensitivity of the test leads to a reduction of the number of positive patients and the rapidity of diagnosis in shortening isolation procedures (tab.1);
3)The shortening of isolation days results in a reduction of decontamination and isolation procedures;
4) The end results is a general overall saving of Hospitalization costs despite the fact that the costs of PCR testing per samples are higher than the method used in the previous years (fig.1,2).

References

1. Kachrimanidou M., Malisiovas N. Clostridium difficile infection: a coprehensive review. Crit Rev Microbiol 2011 37(3): 178-187
2. Lippi MJ, Nero DC, Callahan MA. The impact of hospital-acquired Clostidium difficile. J Gastroenterol Hepatol. 2012 in press