

## Health technology assessment and thyroid surgery

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**SUMMARY:** Health technology assessment and thyroid surgery.

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*The growth of technological innovation, the request for assistance, the rising patient's expectations and the interest of the industry have led to a rise in the cost of health care systems.*

*In this context the role of the National Health System is not to delay the development or adoption of new technologies, but rather to drive the development selecting priorities and promoting its use.*

*Health Technology Assessment (HTA) is a multidisciplinary and multidimensional approach for analyzing the medical-clinical, social, organizational, economic, ethical and legal implications of a technology (devices, drugs, procedures) through the assessment of multiple pa-*

*rameters such as effectiveness, safety, costs of the social and organizational impact. A health technology assessment is a comprehensive, systematic evaluation of the prerequisites for estimating the consequences of using health technology.*

*Main characteristic of HTA is that the problem is tackled using an approach focused on four main elements:*

- technology;
- patient;
- organization;
- economy.

*The authors have applied the HTA method for the analysis of the ultrasonic focus dissector on thyroid surgery. They compared the cost of the surgical procedure using the ultrasonic dissector and without it in a case study of 440 patients who underwent thyroidectomy.*

KEY WORDS: HTA - Thyroid surgery.

## Introduction

The growth of technological innovation, the increased request for assistance due to the aging population, the rising expectations of patients and the interest of the industry, have led to a rise in the cost of health care systems. In this context the role of the National Health System is not to delay the development or adoption of new technologies, but rather to drive their development, selecting priorities and promoting their use.

Health Technology Assessment (HTA) is a multidisciplinary and multidimensional approach for analyzing

the medical-clinical, social, organizational, economic, ethical and legal implications of a technology (devices, drugs, procedures), through the assessment of multiple dimensions such as effectiveness, safety, costs the social and organizational impact (1-3). The objective is to assess the actual and/or potential of the technology, both prior to and during the entire life cycle, as well as the consequences of the introduction or exclusion of an intervention for the health system in the economy society. This methodology has been applied to evaluate the opportunity to introduce routine use in thyroid surgery of the ultrasonic dissector Harmonic focus.

## Patients and methods

On 2012, in the Unit of endocrine surgery of the Department A.O. "S. Maria" (Terni, Italy), 220 thyroidectomies were carried out using the focus and 220 without instruments.

Stored data has been matched with complications, hospitalization time and post-operative consequences on the patient in the use of this technology.

The data was analyzed using the check list of mini-HTA.

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## Results

The data analysis emphasizes that the use of Harmonic Scalpel (HS) in thyroid surgery involves a reduction of operative time (Table 2). In order to estimate the total cost for each procedure we have considered: the technology purchasing cost, involved staff cost, the cost of the operating room, the cost of hospitalization.

The estimated total cost for the procedure, obtained by adding all the cost items previously calculated (see Tables 3 to 4), was subsequently linked to the value DRG 290 applied by the Umbria region for the payment of work performed on an inpatient ordinary (Table 5).

The hospital cost estimated by our analysis of procedures performed with standard tool is € 3,055, while the estimated cost of patients operated with Harmonic is € 2,768.

## Discussion

The increase of the technology, the increase of the average life, the need to reduce the cost of health benefits has led to the development of methods for estimating

the usefulness of each procedure. The HTA started in the U.S. during end of 60s years, it is an analytical tool to assess the economic, social and legal support of new technologies. Therefore it represents the 'bridge' between the scientific and management world. The purpose of HTA is to assist and to advise the health management to drive the health policy. It has been applied for the first time to assess the possibility of incorporating new technologies in radiology services (1-3). HTA is divided into macro, meso e mini. The macro-HTA used to support health policy and macroeconomic. The meso-HTA, also known in the literature as Hospital Based HTA, is designed to support the governance, to divulge qualitative and quantitative standards of care and to encourage the timely transfer of macro-HTA in the health care. The mini-HTA regards, however, the decision-making process directly in the conduct of clinical departments.

Meso- and mini-HTA experience of the Italian health companies have been implemented in the following areas: performance (day surgery, specialist outpatient, home care, etc.), clinical-organization (guidelines, care pathways, audit, etc.), investment plan and management of medical equipment and medical devices, directly in the decision-making process.

The Italian HTA report is based on the Danish mo-

TABLE 1 - CHECK-LIST OF THE MINI-DACEHTA HTA REPORTS.

<p>1) Who is the proponent (hospital, department, person)?</p> <p>2) What is the name/define medical technology?</p> <p>3) What are the parties involved in the proposal?</p> <p style="text-align: center;"><b>Technology</b></p> <p>4) To be used as an indication of therapeutic technology?</p> <p>5) How can you compare/compare the new technology and the traditionally used?</p> <p>6) There are already scientific publications about it (by a department or by others)?</p> <p>7) List the important references and give an assessment of the strength of the evidence.</p> <p>8) What effect causes the patient to the proposal in terms of diagnosis, treatment, care, rehabilitation and prevention?</p> <p>9) The proposal involves risks, adverse effects or contraindications to other reasons?</p> <p>10) There are already studies on the effects of the proposal to other hospitals in Italy or abroad?</p> <p>11) The proposal was recommended by the Ministry of Health, an association of doctors, etc.? If yes, specify by whom.</p> <p>12) In the past, it has already been made by the department a request for such a proposal?</p> <p style="text-align: center;"><b>Patient</b></p> <p>13) The proposal involves ethical or psychological considerations?</p> <p>14) It is expected that the proposal affects the quality of life of the patient?</p> <p style="text-align: center;"><b>Organization</b></p> <p>15) What are the effects of the proposal on staff, in terms of information, training and working environment?</p> <p>16) The proposal may be implemented in the hospital?</p> <p>17) The proposal will have on other departments or hospital services?</p> <p>18) How does the proposal affect the collaboration with other hospitals, regions, primary care (in the event that changes occur in the treatment plan required)?</p> <p>19) When the proposal can be made?</p> <p>20) The proposal is already made in Italy or abroad?</p> <p>21) There are initial costs of labor, rehabilitation, training, etc.?</p> <p>22) What are the consequences, in terms of activities scheduled for the next two years?</p> <p>23) What is the annual cost, or additional savings for the hospital over the next two years?</p> <p>24) What is the total, or additional savings over the next two years?</p> <p>25) As an additional cost or savings expected for other hospitals, industries, etc.?</p> <p>26) What is the margin of error that invests these calculations?</p>
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TABLE 2 - INVOLVED STAFF COST.

Personal involved in each procedure	Spent time for procedure using Harmonic (min)	Spent time for procedure without Harmonic (min)	Gross cost per year (€) (min)	Working time per year	Unit rate €/min (€)	Cost with Harmonic procedure (€)	Cost without Harmonic procedure
Surgeon 1	67,71	96,67	77.633,40	118560	0,65	44	63,30
Surgeon II level 2	67,71	96,67	77.633,40	118560	0,65	89	126,60
Anaesthetist 1	113,7	143,33	77.633,40	118560	0,65	74	93,85
Nurse 1	113,7	143,33	39.602,57	112320	0,35	40	50,54
Total Amount						248	334

TABLE 3.1 - AVERAGE COST OF OPERATING ROOM AND HOSPITALIZATION ABOUT HARMONIC FOCUS PROCEDURE.

Hospitalization cost				Operating room cost			
Admission	Unit rate	Day	Total	Hourly cost	Operating cost rate €/min	Procedure time (min)	Total
Typical	€ 500	2.04	€ 1.020	€ 441,81	€ 8,27	113,7	€ 940,30

TABLE 3.2 - AVERAGE COST OF OPERATING ROOM AND HOSPITALIZATION ABOUT STANDARD PROCEDURE.

Hospitalization cost				Operating room cost			
Admission	Unit rate	Day	Total	Hourly cost	Operating cost rate €/min	Procedure time (min)	Total
Typical	€ 500	3	€ 1.500	€ 441,81	€ 8,27	143,33	€ 1.185,34

TABLE 4.1 - ESTIMATED COST WITH HARMONIC FOCUS PROCEDURE.

Devices cost	Staff cost	Operating room cost	Hospitalization cost	Total
€ 560,45	€ 247,55	€ 940,30	1.020	€ 2.768

TABLE 4.2 - ESTIMATED COST WITH STANDARD PROCEDURE.

Devices cost	Staff cost	Operating room cost	Hospitalization cost	Total
€ 36,15	€ 334,29	€ 1.185,34	€ 1.500	€ 3.055,8

del which identifies the following four points (5-8):

1 - *Technology* - To examine the technology considered to clarify the application and the target, taking into account the possible alternatives, investigate any national or international guidelines;

2 - *Patient* - To examine all aspects that impact on the patient from the use of technology, analysis of reference, the efficacy, safety, risk / benefit, social and ethical aspects;

3 - *Economic evaluation* - To assess the economic consequences of the use of technology;

4 - *Organization* - It is analyzed the influence of technology on the organization of the structure.

TABLE 5 - ESTIMATED COST PER PROCEDURE COMPARED TO TUC DRG 290 RATE (E.G YEAR 2009).

DRG 290 "Thyroidectomy" (Umbria) € 4.974
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The mini-HTA (see Table 1) consists of a checklist that must be completed by who proposes the purchase of a technology for a specific group of patients with a specific clinical and here may be used as a basis for decision-making. The checklist includes: description of the technology, safety and efficacy, therapeutic use, economic and organizational aspects.

The application of the methodology to the use the scissors ultrasonic focus has allowed the benefits identification for the patient (better control of haemostasis, reducing the time of hospitalization) and for the organization of the hospital (see Tables 2 to 5) (3, 4). In fact, the reduction of operating time and hospitalization has allowed us to optimize the use of the operating room and beds in the ward (10-15).

According to economic point of view, the cost of the single intervention with focus is less than the traditional one (tables 2 to 5). This study should allow to enter the device in the routine surgery.

The methodology is extremely useful for assessing the appropriateness of a new technology by analyzing the quality of the instrument and cost benefits for the patient and for the economy.

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