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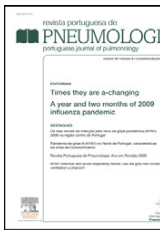

CASE REPORT

The benefits of digital thoracic drainage system for outpatients undergoing pulmonary resection surgery

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Digital thoracic drainage;
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Abstract Since digital thoracic drainage system (DTDS) came onto the market, a number its advantages have become clear, for example that of eliminating the differences betwe observers. The withdrawal of thoracic drainage has been found to be comfortable, safe a well tolerated by patients; it helps to reduce or eliminate the cost of hospital stay, becaus according to the different series published in recent months, it is possible to withdraw dra nage sooner and thus discharge patients earlier. Prospective studies are underway, but as y nothing has been written about the possible benefits in outpatient surgery programmes. In th report we present our findings of 3 cases of patients undergoing pulmonary resection who we treated with continuous intra-domiciliary DTDS. Pending the results of a prospective study no underway our observation is that with properly selected patients this is a safe method.

PALAVRAS-CHAVE
Drenagem torácica digital;
Entrada de ar prolongada;
Cirurgia torácica em doente de ambulatório

Vantagens do sistema de drenagem torácica digital para doentes em ambulatório pa cirurgia de ressecção pulmonar

Resumo Desde que o sistema de drenagem torácica digital (DTDS) apareceu no mercad várias das suas vantagens tornaram-se óbvias, como por exemplo o facto de eliminar diferenças entre os observadores. A remoção do dreno torácico é confortável, segura e be tolerada pelos doentes; ajuda a reduzir ou a eliminar o custo da estadia hospitalar uma vez qu de acordo com as diferentes séries publicadas nos últimos meses, é possível remover o dre mais cedo e, assim, dar alta ao doente mais cedo. Estão a ser elaborados estudos, mas ain não há nada escrito sobre as possíveis vantagens em programas de cirurgia de ambulatóri Neste trabalho apresentamos a nossa experiência em 3 casos de doentes em ambulatório co ressecção pulmonar, que foram tratados com DTDS intra-domiciliar contínua. Até aos resultad de um futuro estudo em elaboração, constatamos que este é um método seguro para doent devidamente seleccionados.

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Introduction

One of the most frequent complications of lung surgery is prolonged air leak,[1,2] which leads to more time of thoracic drainage, longer hospital stays and increased hospital costs. From the time the first DTDS came onto the market,[3,4] there have been many studies aimed at demonstrating that with this system the subjective appreciation of air leak can be eliminated.[5]

Prospective, comparative protocols were early introduced in order to demonstrate that drainage time is indeed shortened,[6,7] this includes our study which compares two different types of DTDS with the traditional system.[8] Based on our experience that this system works and having enough proven experience in Outpatient Thoracic Surgery Programmes,[9] we considered the possibility of offering this system to some carefully selected patients.

This study was reviewed and approved by the Hospital Universitari Sagrat Cor ethics committee. All the patients gave their consent, approved their inclusion in this protocol and were instructed on how to use the device.

Clinical observation

Case 1

A 53-year-old patient, with a history of COPD and a pulmonary nodule in the right upper lobe, was diagnosed with squamous carcinoma by CT guided fine needle aspiration. There were also multiple bilateral emphysematous bullae, without significant adenopathies in the mediastinum. A right upper lobectomy plus lymphadenectomy was performed, using anterior amiotomic thoracotomy, with a final Stage IA T1aN0M0.

In the post-operative period the patient developed a prolonged air leak between 100 and 150 ml/min, and so on post-operative day 7, she was offered the possibility of being discharged with the digital thoracic drainage device (Thopaz Medela Switzerland®), having been instructed on how to use it. The patient was placed under the daily supervision of one of the surgeons in the team, in 24-hour contact by telephone in case of unforeseen circumstances. (Figs. 1 and 2)

Six days after leaving hospital and 13 after the operation, thoracic drainage was withdrawn as the air leak in the previous 24 hours had been less than 10 ml/
This was after assessing the existence of correct
nical re-expansion and no pneumothorax on the c
x-rays.

Case 2

This case relates to a 36-year-old female patient with a c
x-ray that showed complete atelectasis of the upper
lobe. Fiberoptic bronchoscopy revealed a mass occlu
100% of the upper left lobe bronchus and protruding tow
the main bronchus which biopsy proved to be a carci
tumour.

A postero-lateral thoracotomy for an upper
lobectomy with bronchoplasty of the main bron
and mediastinal lymphadenectomy was perform
After 7 days in hospital and radiographic evide
of pulmonary re-expansion, with an air leak
750-950 ml/hour, having ruled bronchial fistula,
patient was discharged with digital drainage (Tho
Medela Switzerland®).

Fifteen days after hospital discharge (22 days after
gery) a gradual reduction of the air leak was verif
Correct clinical and radiographic re-expansion was chec
the digital thoracic drainage air leak had been 0 ml/
for at least the previous 24 hours with no subsequ
complications and therefore thoracic drainage was w
drawn.

Case 3

A 44-year-old female patient with a left-sided spontan
pneumothorax which had been drained. After persisten
leak for over 7 days we proceeded to undergo surgery
video-assisted thoracoscopy performing resection of bu
and abrasive pleurodesis. After 5 days without complete
expansion of the lung and with the air leak quantifie
950 ml/minute, discharge was proposed with digital thor
drainage (Thopaz Medela Switzerland®)

Fifteen days after hospital discharge and 20 after
gery, and with a gradual decrease of the air leak
it was less than 10 ml/min, and with clinical and c
x-ray evidence of pulmonary re-expansion, drainage
withdrawn.

Figure 1 Thopaz Medela is a comfortable and safe device.

Figure 2 DTDS show us objective numeric parameters like de suction pressure and air leak flow. It represents these paramete in graphics that can be downloaded.

Discussion

Without doubt the use of DTDS is becoming increasingly popular in more thoracic surgery units, because it has been demonstrated that early withdrawal of thoracic drainage is possible, due to the safety offered by the objective data of air leak in real time and with monitoring from the moment it is attached.[6–8]

We are still a long way off the ideal thoracic drainage that some authors propose,[10] but we are on the right track and work is being done on this. One example is the appearance of other digital drainage systems on the market like those by Redax (Smiths Medical International)® and the purchase by Medela of the technology offered by another commercial brand (DigiVent Millicore Sweden®). The introduction of a digital device that gives information in real time of the patient's air leak, not just at the bedside, plus the fact that in the future it may be possible to send this information through a PDA, makes it even more feasible for more patients to benefit from short-stay surgery programmes or even outpatient surgery. Our small contribution of three cases serves to demonstrate that this type of monitoring can be carried out with carefully selected patients. All of them lived less than 15 minutes from the hospital, had the knowledge and understanding necessary to be able to use the device, had given their consent and were under 24-hour supervision by the surgeons in charge. It is a real advantage for the patient that although this system requires chest tube aspiration, it does not require connection to a centralised system and it can be monitored at all times, resulting in more comfort at home. It has been shown that intra-hospital costs are reduced with the use of these devices: in one study by €476 per patient per day.[6]

When we compare the use of the digital device with another ambulatory system like the Heimlich valve we can say, that the safety system alarm of the Thopaz in obstruction of the system, makes the digital drainage system a very trustworthy one. With the Heimlich valve, the withdrawal of the drainage is a subjective decision of the surgeon, with the digital device we have a numerical, objective parameter in ml/min that supports our decision. In addition, the Thopaz does not need to be cleaned every day nor the valve changed for the organic residue.

To conclude this preliminary study, which will ha to be confirmed by multicentric prospective studies, w make the case that digital thoracic drainage appar tus is safe, comfortable and well accepted by patient Furthermore, it reduces the number of days in hosp tal and can be used on outpatients with prolonged a leak.

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