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The use of Thopaz pump in the
management of air leaks

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The use of thopaz pump in the management of air leaks. A transition from analogue to standardised digital scoring. Experience of first 100 cases from a single institution

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Background

Chest tube drainage principles and technology remained relatively the same until recently. Most systems are analogue, therefore air leaks are scored subjectively (Fig 4). The ideal chest drainage system should be reliable, simple, safe, portable, cost efficient and offer real time data to help surgeons manage a chest tube. We have therefore tested and present our initial experience with such a digital portable suction system (the Thopaz® Pump-Medela Inc.)



Fig. 1 The Thopaz pump with 800ml and 300ml canisters

Methods

One hundred patients, undergoing elective surgery, were managed and evaluated postoperatively with the Thopaz® Pump. They were all placed on suction at 2KPa provided by the pump itself and air leaks were measured by the pump's microprocessor. Decisions to remove drains were based on the data provided on a graph (Fig. 5-7) recorded by the pump with no visual scoring of underwater seal leaks.

Surgical procedures	Number of patients			Chest drain duration (median)days	Hospital length of stay (median)days
	Vats	Open	Total		
Bilectomy	2	3	5	6.3	6
Lobectomy	8	15	23	5.2	6
Wedge excision	7	1	8	3.6	4
Pulmonary metastasectomy	1	5	6	3.2	5
Lungbiopsy	5	1	6	2.3	2
Lungvolume reducton	3	1	4	11.8	9
Bulectomy + Pleurodesis	13	2	15	2.6	3
Pleural effusion drainage + Pleurodesis	10	1	11	3.2	4
Pectus repair		5	5	4.2	5
Chest wall resection + reconstruction		3	3	5.8	7
Re-do Thoracotomy + Hemothorax evacuation		2	2	3.4	5
Bilateral sympathectomy	1		1	0.3	1
Bilateral Bulectomy + Pleurodesis	4		4	3.6	5
Mediastinal mass excision		4	4	4.2	7
Mediastinal mass biopsy	1		1	1.2	2
Mediastinotomy and staging		2	2	1.5	2
	55	45	100		

Fig. 2 The cohort

Results

Our results revealed that the pump reduced overall Hospital stay with a financial benefit in our practice. Patients were satisfied regarding handling, and ease of use with mobility being the most important advantage of the new device (27 of them had already witnessed the underwater seal bottle system during previous surgery). The pump scored highly amongst the nursing staff regarding safety, ease of use, handling, mobility as well as infection prevention with disposal of consumables.

The recorded data proved a significant advantage in making safe decisions for chest tube removal in morning and afternoon ward rounds by the Junior medical team. Hence, an objective management plan was produced regarding chest tube management unifying practices and simplifying ward rounds.



Fig. 3
Thopaz pump in use



Fig. 4
Old underwater seal system

Fig. 5
Suction or no suction? It is evident that when suction was increased to $-5kPa$, the air-leak was decreased to zero.



Fig. 6
Decisions are relied on continuous recorded air leak data capture and not a snapshot. Use of the traditional underwater seal could have lead to early removal of the drain with possible clinical implications in this patient.

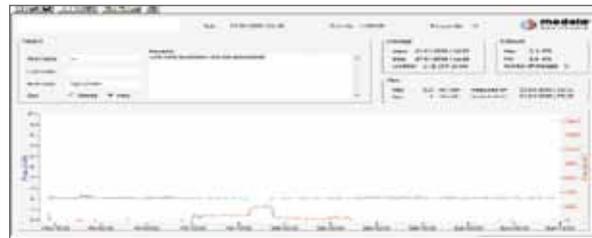
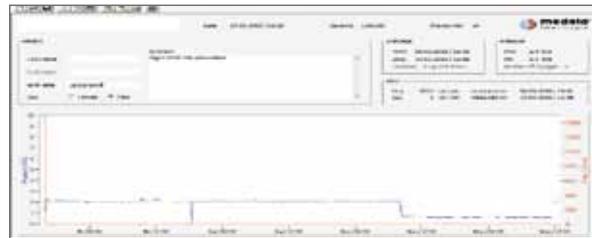


Fig. 7
Gravity mode. The devise was set to gravity mode to test for possible air-leak. After 26 hours of continuous recording, no air-leak was identified and the drain was removed.



References

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Conclusions

The Thopaz pump is compact, safe, easy to use and provides objective recorded data for chest tube management. It offers early and unobstructed mobilisation of patients and aids in securing confident decisions for drain removal. It could extend its future role in the community setting by allowing early discharge with tubes in situ and offsite decisions for chest tube management with interpretation of recorded data over the internet.



“Thopaz offers overall financial benefit to the hospital by aiding patient mobility, reducing their hospital stay, and simplifying hospital practice.”

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