

APA Paediatric Circuit Questionnaire

Background

In 2004, the MHRA conducted an evaluation of paediatric breathing circuits. This suggested that there may be a higher risk of the transmission of infection, hypothesising that paediatric filters may be less efficient due to their smaller internal volume.¹

Criticism has been levelled at the methodology of this evaluation, as the flow rates used were half those as used for testing adult circuits (15 l/min vs 30 l/min), despite these rates being used to test filters designed for neonates and paediatric patients of less than 50% adult size. A subsequent case report from 2007 would appear to support this. It tested 5 paediatric filters at flow rates of 15l/min and a more realistic 3l/min, concluding that there was an improvement in filter performance at the lower flow rate.²

In 2005 the Association of Paediatric Anaesthetists released a statement regarding the reuse of paediatric breathing circuits³. Based on the above evidence they were unable to give a firm recommendation regarding practice. However, they stated that:

“...in the absence of a written local policy to the contrary, re-use of single-use equipment, even with a filter, remains the responsibility of individual practitioners. It is therefore essential to have a departmental policy, agreed by the local clinical governance mechanism, concerning the re-use of such items of equipment, when they are used in conjunction with filters. The policy should take into account the size of the patient, the specification of the filter and the existing evidence.”

We conducted a national survey of APA members to investigate this matter. This focused on the awareness of local and national guidelines. In addition we investigated the current practice and personal opinions of individual practitioners regarding the re-use of both Jackson-Rees and circle circuits with HME filters.

Results

There were a total of 72 overall respondents to the questionnaire. The origin of respondents was as follows: 14 (24%) were anaesthetists in tertiary paediatric hospitals, with the remaining 45 (76%) working in district general hospitals or other specialist hospitals providing some paediatric anaesthesia (59 responses to this question.) 11 (17%) of 65 respondents were aware of national/professional guidance regarding the re-use of paediatric circuits.

Regarding the Jackson-Rees circuit, 26 (36%) of respondents stated that their departments' usual practice was single use, 33 (46%) multiple use, and 13 (18%) may be multiple use for some anaesthetists. For the paediatric circle system, of 65 respondents, 6 (9%) stated that the usual departmental practice was single

use, 53 (82%) multiple use, and 6 (9%) may be multiple use for some anaesthetists. A number of comments reflected this apparent trend for departments to be more likely to re-use circle circuits than Jackson-Rees, although none specified why this should be the case.

Of 40 respondents 14 (35%) stated that Jackson-Rees circuits were re-used for one list, 16 (40%) for one day, and 10 (25%) for one week. Regarding paediatric circle circuits, of 58 respondents 10 (17%) stated one list, 21 (36%) one day, and 27 (47%) 7 days. Both questions attracted comments that circuits would be changed immediately if contaminated or MH risk, and that practice varied. One respondent stated that they relied on the ODP to change circuits, and several others did not know the length of time circuits were used for. 19 anaesthetists (30% of 64 responses) were aware of a departmental policy regarding the reuse of paediatric circuits.

When asked the usual practice in their department regarding re-use of HME/breathing filters, 61 (97%) of the 63 respondents replied they were single patient use, and 2 (3%) that they multiple use. In their professional opinions 61 of 63 respondents (97%) felt it was reasonable to re-use circuits on multiple patients, assuming that the HME's were single use only. Several practitioners commented that though they personally felt it was appropriate to re-use circuits if filters were changed, they were following departmental guidelines for single use. In addition, one respondent commented that if HME's were felt not to be effective filters, then efforts should be concentrated on improving HME's rather than changing circuits.

There was a marked variation between tertiary centre and DGH practice, tertiary centres being more likely to re-use both anaesthetic breathing systems between patients and are more likely to have a policy (57% vs 23%). If re-used, circuits are much more likely to be used for a week before changing in a tertiary centre than DGH (72% vs 7.7% for Jackson Rees, 79% vs 31% for Circle).

Our questionnaire attracted a number of additional comments, raising several issues around the question of the re-use of circuits. Concerns were raised regarding the waste incurred by single patient use of circuits, both in terms of increased landfill, and increased costs. One respondent questioned if the soda lime canisters should also be changed, if it were felt that a circle system truly required single patient use. Many respondents felt it was illogical to change paediatric circuits and not adult circuits. Another respondent stated they were unhappy to reuse circuits due to potential for contamination by body fluids etc in surgical environment rather than concern regarding effectiveness of filters.

Conclusion

Our survey demonstrates that relatively few (17%) anaesthetists are aware of national guidance regarding the re-use of paediatric circuits. Despite the APA statement, only 30% of respondents were aware of a departmental guideline regarding the re-use of paediatric circuits. Departments appear far less likely to re-use Jackson-Rees circuits than circle circuits (36% single use vs 9% single

use), though no comments indicated why this should be so. Almost all respondents reported single use of HME filters.

The vast majority of anaesthetists (97%) considered it appropriate to reuse circuits as long as a single use HME were used. Concerns were raised regarding the environmental and cost implications of re-using circuits. One respondent raised the point that if HME filters were not felt to be fully effective then manufacturers should aim to improve this, rather than changing circuits.

We feel that this survey provides a reasonable reflection of current UK practice with regard to the re-use of paediatric anaesthetic breathing circuits. It is of concern that the majority of departments do not have a clear policy covering this as recommended by the APA. We feel this survey provides a body of reasonable professional opinion and hopefully will reassure departments when formulating their own policies. We also feel that experimental work should be undertaken to test paediatric circuits under more realistic conditions, to clearly define whether modern paediatric HME filters provide sufficient microbiological protection to allow multiple patient use.

1. Wilkes A. Breathing System Filters: an assessment of 104 breathing systems filters. MHRA Evaluation 04005, March 2004.
2. Malan C A, Wilkes A R et al. An evaluation of the filtration performance of paediatric breathing system filters at low flows. *Anaesthesia* 2007, **62**:504-508.
3. Bennett N and Bingham R. Statement on Paediatric Filters and Breathing Systems. Association of Paediatric Anaesthetists of Great Britain and Ireland. Jan 2005.

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