Glass recycling in the labour suite is environmentally sound and economical

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Background. Glass bottles are used for the storage of local anaesthetics in the US and are recyclable. Recycling would result in hospital solid waste reduction.

Methods. The members of the Department of Anesthesia were surveyed to determine where these local anaesthetic bottles were disposed of. From November 2002 to April 2003, glass bottles used on the labour and delivery suite were saved for recycling. The number of bottles and the weight recycled were recorded. The number of procedures involving anaesthesia were also recorded during this time period.

Results. Residents dispose of the local anaesthetic bottle in the sharps container while consultants dispose of them in the trash (P<0.05). Both means of disposal are not recycled in the US. The average amount of glass recycled per month was 19.37 (3.15) kg. Our hospital pays $0.46/kg (£0.26/kg) for sharps disposal. By not disposing of the glass in the sharps container, the average savings per month was $8.95 (1.45) (£5.15 (0.84)).

Conclusion. The recycling of glass is good for the environment through waste reduction and results in small savings to the hospital.

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In the year 2000, the US generated approximately 231.9 million tons of solid waste.1 This amount represents an increase of 0.9 million tons from 1999. Of this waste, only 53.4 million tons were recycled. Glass, paper, plastic, and metal can be recycled. Recycling provides a positive impact on the environment by reducing the amount that must be disposed of and preserving natural resources.

The disposal of waste from a hospital represents a major challenge confronting hospital administrators. In 1998, the Environmental Protection Agency issued a joint statement with the American Hospital Association aiming to reduce hospital solid waste by 33% by the year 2005.2 Glass represents one of these substances. It is easily saved and recycled.

We studied the feasibility of glass recycling on the labour and delivery suite. We chose this location as the vast majority of anaesthesics involve the use of local anaesthetics, which are supplied in recyclable glass bottles.

Methods and results

After obtaining Internal Review Board approval, the members of the Department of Anaesthesia were surveyed. The survey contained only one question, ‘Following the completion of a regional anaesthetic, where do you dispose of the local anaesthetic glass bottle: (a) sharps container, (b) infectious waste, or (c) regular waste (no special precautions taken with disposal)?’ The replies from residents and consultants were recorded.

From November 2002 to April 2003, the residents and consultants who rotate on the obstetric anaesthesia service were asked to save all glass bottles generated during the conduct of a regional anaesthetic. The types of bottles saved included those containing local anaesthetic (30 cc container), sodium bicarbonate (50 cc container), a large container of ropivacaine (100 cc container), and antibiotic (10 cc container). Glass ampoules were not saved, as these ampoules are not recyclable in the US (these ampoules are
of a different quality of glass and would contaminate the recycled glass. The bottles had the metal lids and labels removed. It takes approximately 5 min to prepare 15 glass containers for recycling. The glass was weighed and then recycled.

During the study period, the number of procedures requiring anaesthesia was recorded. These procedures included spontaneous vaginal deliveries (SVD), Caesarean section (C-sect), and other procedures (bilateral tubal ligation, dilatation and curettage, and maternal sedation for fetal procedures). Statistical analysis included Student’s *t*-test for comparison of amounts recycled, *χ²* test for comparing consultants with residents, and Spearman rank order correlation to compare the number of cases per month to the weight of glass recycled.

Sixty-six residents and 41 consultants in the Department of Anaesthesia at the Hospital of the University of Pennsylvania were surveyed. Fifty-four residents (81%) and 29 consultants (70%) responded. Of the responding consultants, 19 (65%) would dispose of the glass bottles in the regular trash (not recycled and disposed of in a landfill site). Of the responding residents, six (9%) would dispose of the glass bottles in the regular trash. The rest of the residents dispose of the glass bottles in the sharps container (non-recycled and incinerated). The number of consultants disposing of the glass bottles in the regular trash was significantly greater than the number of residents doing so (*P*<0.02).

The number of procedures, the number of bottles, their weight, and the savings made are given in Table 1. The mean (SD) weight of the glass recycled per month was 19.37 (3.15) kg and the mean (SD) savings per month is $8.95 (1.45) (£5.16 (0.84)). There was a strong correlation between the number of cases per month and the total weight of glass recycled per month (correlation coefficient 0.83, *P*<0.05).

**Comment**

The provision of anaesthesia for labour and delivery involves large quantities of local anaesthetic and sodium bicarbonate. The addition of sodium bicarbonate to lidocaine for Caesarean section decreases the time to onset of block. Sodium bicarbonate is also used during epidural or spinal placement, when it is added to the local anaesthetic used for skin infiltration to decrease the pain of injection. Our labour and delivery suite generates much glass waste. As the majority of anaesthetics are performed by the residents, most of this glass waste is disposed of in the sharps container. This glass is not recycled and represents hospital waste. Our study changed this mode of disposal and now recycles this waste. It is important to note that these results apply only to our institution. Other departments would need to evaluate their approach to recyclable waste management.

Our institution pays $0.46/kg (£0.26/kg) for disposal of sharps. In recycling, we were able to save an average of $8.95/month (£5.16/month). We only measured the weight of the glass. When the resident disposes of the bottle in the sharps container, it is not emptied and still contains local anaesthetic, hence weighing more than an empty bottle. The savings determined therefore represent the minimal and may be much greater.

Glass bottles are also frequently disposed of in the trash. While this process results in savings, it increases the risk to those who dispose of the trash. Trash is crushed, resulting in breakage of the bottle. This broken glass could puncture the bag and injure the handler. A review of injuries to hospital housekeepers reported an incidence of 4.6 injuries per 100 housekeepers per year. The majority of these injuries were cuts and punctures with 70% attributable to glass. Recycling glass bottles decreases the risk of puncture injury to housekeepers.

Recycling glass is good for the environment. Less energy is required to recycle glass than create new glass. There is no need for new raw materials. In 2000, 12.9 million tons of glass were generated, but only 2.9 million tons were recycled in the US. The recycling of glass (23%) occurs to a much lesser extent than recycling of paper (45.4%), for reasons which are unclear. At another small hospital, it was determined that 41 000 kg of waste per year could be recycled from its operating rooms. While not as substantial,
we are able to recycle an average of 240 kg per year of glass. This amount comes from only one location. A major initiative could increase this amount by involving other locations such as the operating rooms.

Only glass bottles can be recycled. Glass ampoules are not recyclable in the US because of the poorer quality of the glass. If these ampoules were placed in the recycling container, they would contaminate the recycled glass and render it useless. We attempted to obtain each recyclable glass product; however, bottles were still disposed of in the sharps container despite frequent reminders. To be successful, all members of the care team must support the practice and make the extra effort to place the bottle in the recycling container. The correlation between the number of cases and the amount of glass recycled suggests that a majority of the available glass was recycled.

The tracking of glass bottles, which resulted from this study, was also useful. We saw a decrease in the number of 100 ml ropivacaine bottles used for continuous infusion in February and March, 2003. Ropivacaine is a more expensive local anaesthetic. During these months, one consultant was on sabbatical. We learned that his practice differs from other consultants in that he uses only ropivacaine 0.2% (100 ml bottles) for labour analgesia. By identifying that his practice differed from his colleagues, we were able to discuss and evaluate his practice. Furthermore, in February 2003, there was a marked increase in the number of sodium bicarbonate bottles used. After questioning the residents, it was discovered that one resident used sodium bicarbonate as a single use container. The resident was instructed that with proper dating, sodium bicarbonate might be used more than once. By examining the amount of glass recycled, practice patterns were therefore identified. These practice patterns were useful for education and for further savings.

The recycling of glass on a busy labour and delivery suite is feasible. It has a positive impact on the environment and improves the safety of housekeeping. By not placing the glass in the sharps container, the hospital saved money, although the savings were not great. An interesting sideline was the identification of practice patterns. These patterns can be used for cost effective refinement of a physician’s practice.

References


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