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**REFERENCES**


### No Closure for Patent Foramen Ovale in Obstructive Sleep Apnea?

_To the Editor:_

We read with interest the report in a recent issue of CHEST (January 2013) by Shaikh et al regarding the association between patent foramen ovale (PFO) and obstructive sleep apnea (OSA). However, we believe that their conclusion stating the lack of benefit of PFO closure in OSA is unduly pessimistic and premature. They attempted closure of only six large PFOs with the BioSTAR device (NMT Medical Inc) and acknowledge their small sample size. However, at 12-month follow-up only three PFOs had sealed. Two of these were sizeable and had no embolic complications or symptoms. Further studies are needed to determine the clinical benefit of PFO closure in OSA. 4

### Table 1—Survey Questions and Number of Correct Answers Before and After Access to Educational Brochure

<table>
<thead>
<tr>
<th>Question</th>
<th>Before Brochure Correct</th>
<th>After Brochure Correct</th>
<th>Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>If you are a carrier of CF, what are the typical medical problems you will have?</td>
<td>17 (42.5)</td>
<td>24 (60)</td>
<td>41.2</td>
</tr>
<tr>
<td>If you have CF and your partner is a healthy noncarrier, what is the chance that your child will be a carrier?</td>
<td>11 (27.5)</td>
<td>24 (60)</td>
<td>118</td>
</tr>
<tr>
<td>What is the chance for parents who are both carriers to have a child that does not have CF?</td>
<td>9 (22.5)</td>
<td>21 (52.5)</td>
<td>133</td>
</tr>
<tr>
<td>If two parents with no sign of having CF already have a child with CF, what is the chance their next child could have CF?</td>
<td>16 (40)</td>
<td>26 (65)</td>
<td>62.5</td>
</tr>
<tr>
<td>When considering pregnancy, an individual with CF should:</td>
<td>34 (85)</td>
<td>38 (95)</td>
<td>11.8</td>
</tr>
<tr>
<td>Is the chance of having children without help different for males and females with CF?</td>
<td>20 (50)</td>
<td>30 (75)</td>
<td>50</td>
</tr>
<tr>
<td>What is the main reason that a male with CF would be infertile?</td>
<td>19 (47.5)</td>
<td>35 (87.5)</td>
<td>84.2</td>
</tr>
<tr>
<td>What is the main reason that a female with CF would be infertile?</td>
<td>13 (32.5)</td>
<td>36 (90)</td>
<td>177</td>
</tr>
<tr>
<td>When considering pregnancy, what is the biggest risk for women with CF?</td>
<td>13 (32.5)</td>
<td>28 (70)</td>
<td>115</td>
</tr>
<tr>
<td>If you are infertile because of CF, what are your options to have a child?</td>
<td>7 (17.5)</td>
<td>18 (45)</td>
<td>157</td>
</tr>
<tr>
<td>If you have CF, can you adopt a child?</td>
<td>28 (70)</td>
<td>33 (82.5)</td>
<td>17.8</td>
</tr>
<tr>
<td>If you have CF and your partner is also a carrier, what technology can you use to ensure that your child does not have CF?</td>
<td>5 (12.5)</td>
<td>31 (77.5)</td>
<td>520</td>
</tr>
</tbody>
</table>

Data are presented as No. (%), unless otherwise indicated. CF = cystic fibrosis.

*More than one answer was deemed correct. The total sum of both answers is used in this table.
The closure data are further weakened by performing PFO closure in individuals who were not oxygen desaturators; the oxygen desaturation index (ODI)/apnea-hypopnea index (AHI) ratio was low, ranging from 0.34 to 0.87 at baseline. Patients with OSA and large right-to-left shunts who desaturate out of proportion to their apnea-hypopnea episodes would be more likely to benefit from PFO closure, in our opinion. Furthermore, we believe the treatment interaction between OSA and PFO is bidirectional. Existing case reports show that OSA symptoms may improve following closure of a PFO for other indications, but CPAP therapy for OSA can also suppress right-to-left shunting due to a PFO. The use of CPAP therapy in some, but not all, of the closure group may mask any observable benefit.

Taken together, this could explain why no discernible improvement in OSA was observed following BioSTAR implantation in this study. It remains to be seen if a device that truly seals the PFO can improve clinical outcome in a carefully selected group of patients with OSA.

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Response

To the Editor:

We thank Dr Hoole and colleagues for their comments regarding our article1 reporting the outcome of patent foramen ovale closure in a small number of patients with obstructive sleep apnea. The first issue raised was the choice of closure device. However, in the absence of data, we are unable to comment on the use of other devices in obstructive sleep apnea.

Second, although we selected patients with a large physiologic shunt assessed during wakefulness, we accept that it may have been more logical to select on the basis of physiologic shunt during sleep. This could be conveniently assessed as the oxygen desaturation index/apnea-hypopnea index ratio, although in the future, more direct measurement during sleep may also be possible.

Last, we concluded that patent foramen ovale closure on clinical grounds was not justified. While we maintain this stance, we do accept that a trial using a different device, and powered on appropriate pilot data with different entry criteria, could yield a positive result. However, our data give no reason to believe so, and the variation that we observed leads us to suspect that the sample size required would be large. For this reason, we are not planning to do such a study ourselves. Of course, we agree with their final comment that additional data are needed.

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Pharmacotherapy Refractory Insomnia in Soldiers With Traumatic Brain Injury

To the Editor:

The article by Collen et al1 in a recent issue of CHEST (September 2012) highlighted multiple important aspects of the