

Documentation of the current state of cardiopulmonary bypass management in Türkiye

Türkiye’de kardiyopulmoner baypas idamesinin güncel durumunun dökümantasyonu

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Institution where the research was done:

It was conducted in 97 centres by the Perfusionists Association in Türkiye

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ABSTRACT

Since the first successful use of cardiopulmonary bypass (CPB), much has changed in its technology, area of use, and management. Despite suggestions in guidelines, the institutional behavior may change based on institutional experience and established habits. This so-called “deviation” may alter management strategies in favorable or unfavorable ways. As the official Cardiopulmonary Bypass Study Group of the Association of Perfusionists in Türkiye, we aimed to document the current state of CPB management in Türkiye and make suggestions based on current guidelines. A 20-item questionnaire e-mailed to 682 perfusionists in 110 centers in Türkiye, and 177 (25.95%) responses were recorded from 97 centers. The questionnaire included main parameters regarding the management of CPB. We believe that by documenting the current state of CPB management strategies in Türkiye, suboptimal management strategies can be improved and suggestions for more favorable outcomes can be made.

Keywords: Cardiopulmonary bypass, perfusion, prime solution.

Since the first successful use of cardiopulmonary bypass (CPB) on May 6, 1953, by John Gibbon, much has changed in its technology, area of use, and management.^[1] The most recent guideline comprising its constituents and management was published in year 2019 by EACTS (European Association for Cardio-Thoracic Surgery), EACTA (European Association of Cardiothoracic Anesthesiology), and EBCP (European Board of Cardiovascular

ÖZ

Kardiyopulmoner baypasın (KPB) ilk başarılı kullanımından bu yana teknolojisi, kullanım alanı ve yönetiminde çok şey değişti. Kılavuzlardaki önerilere rağmen kurumsal davranışlar, kurumsal deneyime ve yerleşmiş alışkanlıklara bağlı olarak değişebilir. Bu sözde “sapma”, yönetim stratejilerini olumlu veya olumsuz şekillerde değiştirebilir. Türkiye’deki Perfüzyonistler Derneği’nin resmi Kardiyopulmoner Baypas Çalışma Grubu olarak, Türkiye’deki KPB yönetiminin mevcut durumunu belgelemeyi ve güncel kılavuzlara dayalı önerilerde bulunmayı amaçladık. Türkiye’deki 110 merkezdeki 682 perfüzyon uzmanına 20 maddelik bir anket e-posta aracılığıyla gönderildi ve 97 merkezden 177 (%25.95) yanıt kaydedildi. Anket, KPB yönetimine ilişkin ana parametreleri içeriyordu. Türkiye’deki KPB yönetim stratejilerinin mevcut durumunun belgelenmesiyle, suboptimal yönetim stratejilerinin iyileştirilebileceğini ve daha olumlu sonuçlara yönelik önerilerde bulunulabileceğini düşünüyoruz.

Anahtar sözcükler: Kardiyopulmoner baypas, perfüzyon, doldurma çözeltisi.

Perfusion).^[2] Despite recommendations in guidelines, the institutional behavior may change based on institutional experience and established habits. This so-called “deviation” may alter management strategies in favorable or unfavorable ways. As the official Cardiopulmonary Bypass Study Group of the Turkish Perfusion Association, we aimed to document the current state of CPB management in Türkiye and make suggestions based on current

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guidelines. For this purpose, a 20-item questionnaire was e-mailed to 682 perfusionists in 110 centers in Türkiye, and 177 (25.95%) responses were recorded from 97 centers. Since a similar “current state study” conducted by a questionnaire was responded by 26.3% of cardiovascular surgery specialists, the percentage of responders in our mini-study appeared to be satisfactory.^[3] The questionnaire also included demographic findings of perfusionists; however, those results are not mentioned here because they fall outside the scope of this paper.

Of the responders, 88.5% stated that they had a protocol for CPB prime solution, while 79.3% claimed that a prebypass filter was employed while priming. The above-mentioned guideline strictly recommends that each department should have written operating procedures for conducting CPB (Recommendation Class I, Level of Evidence C). It should be mentioned that institutions without protocols should be encouraged to develop them.

In the study, 84.5% responded that integrated microporous membrane oxygenators were used, in accordance with the guideline (Recommendation Class I, Level of Evidence B), and 75.3% employed arterial filters within tubing sets (Recommendation Class I, Level of Evidence C). Additionally, 62.1% used blood cardioplegia, whereas the rest used crystalloid. The route of cardioplegia was via CPB in 56.9%, while 33.1% used manual delivery systems employed by the anesthesia team.

The priming solution volume was 20 mL/kg. To reduce priming volume, 32.2% used retrograde autologous priming (as suggested by the guideline; Recommendation Class I, Level of Evidence A), 9.8% used minimally invasive extracorporeal circulation (as suggested by the guideline; Recommendation Class IIa, Level of Evidence B), 5.7% used miniplegia, and 69.5% used special tubing schemes to shorten the tubing lines.^[2] Of the responders, 18.4% had no special technique to decrease priming volume. Priming solution preference was crystalloid in 78.7%, while it was colloid in 20.1%. If colloid solutions were preferred, 54.4% used modern HES (hydroxyethyl starch) solutions, 13.9% used human albumin, and 20.3% used gelatin agents. It is useful to state here that the guideline does not recommend the use of modern HES solutions to decrease blood loss (Recommendation Class III, Level of Evidence C).^[2] If crystalloids were of choice, it was Izolen-S (Biofarma, İstanbul, Türkiye) in 78.2%,

lactate ringer solution in 12.6%, ringer solution in 20.7%, and 0.9% sodium chloride solution in 13.8%. There is no clear suggestion in the guideline for priming solutions.^[2] Heparin was added to the priming solution by 96.6% of responders, whereas 92% added 20% mannitol, 52.3 mEq/L of sodium bicarbonate, and 21.8 mg/L of magnesium sulfate. Of the responders, 89.1% did not add any blood or constituents to the priming solution.

In conclusion, by documenting the current state of cardiopulmonary bypass management strategies in Türkiye, we believe that suboptimal management strategies can be corrected and suggestions for more favorable outcomes can be made. Guideline adherence appears to be heterogenous among perfusionists since the percentage of perfusionists following guidelines differ based on different parameters, which are discussed elsewhere in the text.

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