

Outcome of bone allografts received from deceased bone donors in UMMC Bone Bank

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Introduction

UMMC Bone Bank started to receive cadaveric long bones in 2015, coordinated by National Transplant Resource Centre (NTRC), Ministry of Health (MOH). Long bones are commonly used in orthopaedic trauma, oncology, and revision surgeries. The bank is responsible for ensuring that the bones are properly sterilized, stored and safe for transplant.

Objective

To analyze the performance of the deceased bone received in UMMC Bone Bank from 2015 to 2022, addressing number of collected, rejected and those accepted bone allografts. Reasons for rejection were evaluated.

Methods

The NTRC identified and screened potential deceased donors before approaching family members for consent for bone donation. Prior to bone procurement, donors' blood was tested for infectious diseases. Bone procurement was performed in the operating theatre. Bones from lower limb (femur, tibia and fibula) and upper limb (humerus, radius and ulna) were usually procured. Swab from each bone was obtained for culture and sensitivity (C&S) test and sent to microbiology laboratory. Each bone was triple packed and immediately sent to Bone Bank. The bones were stored in quarantine freezer, donor IDs were given once microbiological tests were negative.

Results

A total of 209 long bones were procured from 33 donors. Of these, 89 (42.6%) bones were despatched as bone allografts for transplant, 45 (21.5%) bones being stored in deep freezer and waiting for transplant request (Figure 1). Unfortunately, 75 (35.9%) bones were rejected due to various reasons (Figure 2). Failure of freezer and positive bacteriology results were the main causes during 2015-2019. The latter still contributed to bone rejection after 2019 but in reduced trend. The most frequently encountered microorganisms were coagulase-negative Staphylococcus and Bacillus sp. The spectrum of microorganisms found was almost the same for the past 8 years. There were no transplant cases in 2016, 2017 and 2019 as most of the bones were rejected due to -80oC freezer failure, that was used to store bones. Progressive reduction was observed after the freezer was disposed because beyond economical repair. The bank started to use a new freezer with an alarm system for alert security. There were no transplant cases in 2021 due to Covid-19 pandemic. No rejected bones in 2022, suggesting that all protocols in bone banking were strictly followed.

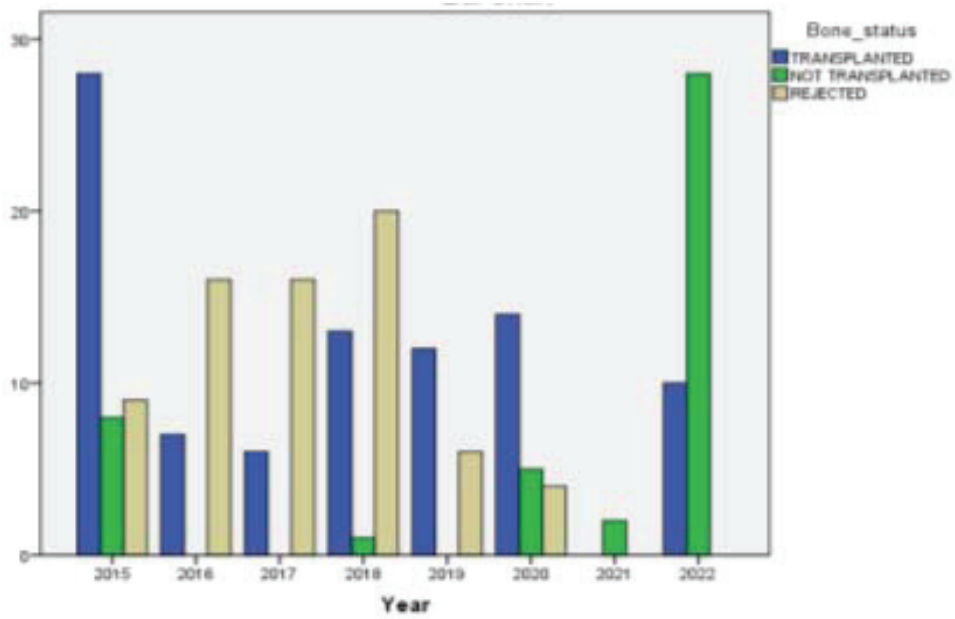


Figure 1: Total number of transplanted, not transplanted and rejected bones 2015-2022

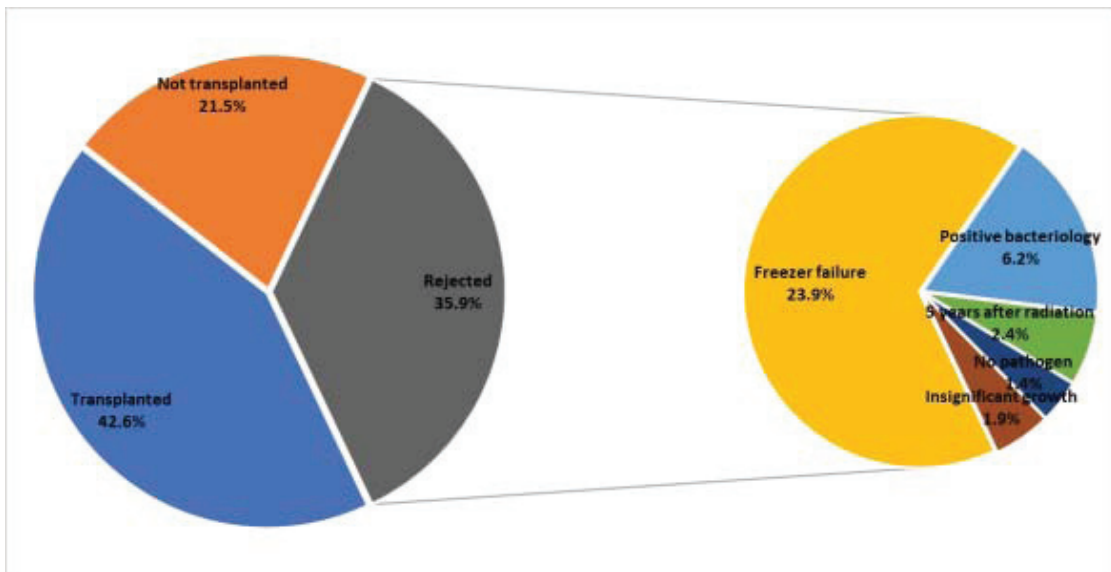


Figure 2: Percentage of bone status and reasons for rejection

Conclusions

The outcome of cadaveric bone allografts is improving year by year with strict quality system in place. Rigorous bone banking practices including proper bone handling during procurement, storage and maintenance of equipment are essential to make sure all the donated bones can be accepted and safe for clinical applications.