

ISOT position statement on the feasibility of an organ for transplantation from brain-dead deceased donors: a Delphi consensus

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Summary

Organ shortage remains a critical challenge in India's transplant landscape, despite established deceased donor organ transplantation (DDOT) programmes. Many potentially viable organs from brain-dead deceased donors (DBDs) are discarded due to uncertainties surrounding donor suitability in specific clinical scenarios. To address this gap, the Indian Society of Organ Transplantation (ISOT) convened a panel of national experts to develop a Delphi consensus statement aimed at guiding transplant professionals on the feasibility of organ donation from DBDs, particularly in complex or marginal donor situations. This position statement presents 19 consensus recommendations based on real-world clinical contexts such as extremes of age, acute kidney injury, infections (including HCV, HBV, HIV, tuberculosis, and tropical diseases), malignancy, diabetes, hypertension, and various surgical anomalies. The guidance is grounded in available literature, registry data, and extensive clinical experience, with the aim of expanding the DBD donor pool across Asia and improving access to transplantation for patients with end-stage organ failure. The consensus does not function as a formal clinical guideline but rather as a practical reference tool, acknowledging the limitations in India-specific data and the contextual differences from Western transplant settings. It encourages critical care and transplant teams to perform structured assessments of organ viability, apply ethical principles, and pursue informed consent in line with local regulations.

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Background

Organ shortages are a global challenge that affects donor transplant programs worldwide, and programs in various states of India are no exception.¹ India currently ranks second in the world for the highest absolute number of transplants, following the United States.^{2,3} In 2022, deceased donor organ transplantation (DDOTs) accounted for nearly 17.8% of all transplants in India.⁴ The World Health Organization (WHO) has called on all countries to achieve self-sufficiency in organ transplantation.⁵ In line with this, the Government of India launched the 2023 “One Nation, One Policy” for DDOT, which removed the upper age limit of 65 years for registering to receive deceased donor organs. This change has expanded the recipient pool for DDOTs. The policy also eliminated the requirement of state domicile for registering patients for DDOT, which will help address the significant regional disparity in organ donation programs.⁶ While this policy is still in its early stages, its long-term impact and implications remain to be fully assessed.

DDOT includes two types: donation after brain death (DBD) and donation after cardiac death (DCD), also known as donation after circulatory death (DCD) or non-beating-heart donation. In India, most DDOTs are DBD, with kidney donation being the most common organ transplanted.⁵ Despite the establishment of organ donation from DBD in India, the rate of DBD organ donation remains low.⁵ Additionally, although more than half of patients (from newborns to 22-year-olds) with brain death and multiple organ dysfunction syndrome (MODS) are eligible to donate organs, their organs are often discarded.⁷ This is largely due to the lack of consensus on the feasibility of using organs from potential DBD donors for donation.⁸ Current organ

donation guidelines primarily focus on procurement methods, regulations, and ethical considerations.^{5,9} However, there are no clear guidelines available for day-to-day clinical scenarios that require quick decisions regarding the viability of DBD organs for donation.

This consensus statement from the Indian Society of Organ Transplantation (ISOT) aims to raise awareness among critical care staff and other healthcare professionals involved in organ transplantation. It encourages the identification of potential DBD donors and seeks to increase the number of DBD organ donations, ultimately helping to bridge the organ shortage gap in India.

The typical DBD transplant is harvested from standard criteria donors (SCD). These donors are typically under 50 years old and do not have comorbidities such as diabetes, hypertension, or kidney dysfunction.^{10,11} However, due to the shortage of donor organs and the long waiting list for patients with end-stage organ disease, there has been a need to explore options beyond SCD, which includes expanded criteria donors (ECD) or marginal donors.^{10,11}

Currently, ECDs include patients at the extremes of age and those with at least one of the following conditions: hypertension, cerebrovascular events as the cause of brain death, pre-retrieval serum creatinine levels greater than 1.5 mg/dl, glomerulosclerosis exceeding 15%, or prolonged cold ischemia.^{10–12} The ISOT Expert Committee considered these criteria (outlined in Table 1) for identifying a deceased donor (DD) as an ECD in India.

The clinical scenarios in India differ significantly from those in Western countries and other regions of the world. Therefore, the Experts expanded the ECD

criteria to include additional conditions based on the unique situation in India. Organs from these expanded ECDs may still be viable for deceased donor organ transplantation (DDOT). This consensus aims to identify organs from such DDs that could be considered for patients with end-stage organ disease who are on the organ donation waiting list.

Methods

A comprehensive literature search was conducted on MEDLINE/PubMed and Google Scholar using the search terms “deceased donors” and “cadaveric donors” to identify relevant studies on organ donation. Both Indian and international studies focusing on organ donation from deceased expanded criteria donors (ECD) or marginal donors were considered, with a preference for those from India.^{10–13}

The literature was categorised by type of ECD/marginal DD, as outlined in Table 1. Given the nature of the subject, the literature retrieved consisted mainly of organ donation guidelines, retrospective cohort studies, registry-based studies, real-world single-institution experiences, and case series. Systematic reviews were largely absent, and no randomised controlled trials were found. Therefore, no grading for the level of evidence was applied to the retrieved literature. A significant gap in literature from India was identified, and the Experts acknowledged that clinical and transplant scenarios in India differ greatly from those in Western countries and other regions. Hence, they felt that a guidance document on the feasibility of using organs from potential deceased donors (DDs) could only be developed through shared knowledge and clinical experience from India.

A modified Delphi process (Supplementary Fig. S1) was employed to develop the consensus.¹⁴ The multidisciplinary expert panellists included eminent transplant specialists, intensive care specialists, pathologists, and surgeons from various parts of India who have made major academic contributions in the field of kidney transplants and intensive care management. Based on the literature review, a set of consensus statements was formulated by experts. These statements, along with the supporting literature, were shared with ISOT members before the advisory board meeting on April 27–28, 2024. For the meeting, an expert panel was created for each type of ECD/marginal DD listed in Table 1. During the meeting, an ISOT expert presented literature on the use of organs from one of the ECD/marginal DD categories. This was followed by a thorough discussion of the available literature and the clinical experience of the ISOT panel members, facilitated by the panel chair.

After the discussion, the proposed consensus statements were projected on the screen. ISOT members

1	Extremes of age (<12 years or ≥65 years)
2	<p>>50 years with two of the following criteria:</p> <ul style="list-style-type: none"> • Hypertension • Cerebrovascular cause of brain death • Pre-retrieval serum creatinine >1.5 mg/dl, with glomerulosclerosis of >15%^a • Prolonged cold ischaemia
3	<p>Donor (any age) with</p> <ul style="list-style-type: none"> • Acute kidney injury (with or without dialysis) • Diabetes • Hypertension • Malignancy • HBV/HCV/HIV
4	<p>Other conditions that may affect the quality of organs^b</p> <ul style="list-style-type: none"> • Infected donors <ul style="list-style-type: none"> ◦ Systemic infection ◦ Pneumonia ◦ Infective endocarditis ◦ Tropical infections: dengue, malaria, leptospira (past/present) ◦ Past and active tuberculosis • Poisoning • Drug overdose • Renal surgical issues: kidney stones, horseshoe kidney, Young deceased donor with kidney cysts

HBV, hepatitis B virus; HCV, hepatitis C virus; HIV, human immunodeficiency virus. ^aIf procurement biopsy is not feasible, the decision to use or discard kidneys should be based on clinical severity, degree of oliguria, and need for dialysis. ^bUsually not criteria for marginal donors, but being considered for India because organs from these deceased donors are often discarded.

Table 1: Expanded criteria deceased donors or marginal donors.

voted on the statements using four options: “Strongly Agree,” “Agree,” “Disagree,” and “Strongly Disagree.” Any statement that received ≥70% “Strongly Agree” or “Agree” votes was accepted as the consensus. Any statement that received ≥70% “Disagree” or “Strongly Disagree” votes was revisited for further discussion. Panel members were encouraged to provide their views, and statements were revised based on suggestions. A second round of voting occurred for these revised statements. If ≥70% of ISOT members voted in favour of a revised statement, it was accepted as consensus; if ≥70% voted against it, the statement was discarded. Given the lack of Indian literature on these topics, the Experts decided to include some of the statements as a supplement for a broader audience. Given the limited and low-quality data available regarding many aspects of the selected topics, the steering committee did not use the GRADE system; instead, it used the AGREE reporting checklist to prepare the expert statements. The voting process was conducted anonymously online to avoid reciprocal influence.

ISOT is not developing this document as a guideline, as robust data on deceased donor organ transplantation (DDOT) from India is lacking. This consensus provides suggestions regarding the feasibility of organ donation from marginal/ECD brain-dead donors, whose organs are often discarded without proper evaluation or due diligence. According to data from the National Organ and Tissue Transplant Organisation (NOTTO) (2013–2018), the most commonly

harvested organs from deceased donors (DD) were the kidney, liver, heart, and lung, followed by the pancreas and small bowel.² In alignment with this, the ISOT consensus statements focus on the organs listed in [Supplementary Table S1](#), unless otherwise specified. General criteria for brain death in both adults and paediatric age groups are listed in [Supplementary Table S2](#).

ISOT's suggestions for organ donation from DDs are contingent upon a complete evaluation of the organ's structural and functional viability. A careful risk-benefit analysis should be conducted for optimal allocation to the appropriate recipient. Informed consent must be obtained from the recipient after providing a thorough explanation of the risks involved, including the potential risk of organ failure. Furthermore, a detailed plan for post-transplant monitoring must be in place. ISOT's suggestions are also subject to adherence to ethical and regulatory requirements for DDOT. The aim is to determine the feasibility of using organs from DDs for transplantation. ISOT hopes this will expand the organ donation pool, ultimately improving survival rates, life expectancy, and the quality of life for patients with end-stage organ failure.

The consensus document does not address recipient management post-transplant; however, if DDOT is conditional upon prophylaxis or therapy for the recipient, these considerations have been incorporated into the consensus statements.

Results

Overview of the consensus statements

Donors with acute kidney injury (with or without dialysis)
AKI is common in deceased donors (DDs) who are haemodynamically unstable after brain death, and kidneys from DDs with AKI are often discarded without evaluation ([Table 2](#)). Utilising these kidneys can significantly expand the donor pool.^{15,16} Studies show that KT from ECD kidneys, including those with AKI, results in similar recipient and graft survival rates compared to kidneys from standard criteria donors (SCD).^{15–26} The risk of primary graft nonfunction is not higher for kidneys from donors with AKI. A multi-continent meta-analysis showed similar estimated glomerular filtration rates (eGFR) at ≥ 12 months for recipients of kidneys from donors with or without AKI.¹⁶ Kidneys from donors with AKI and no significant cortical necrosis (<10%) have similar outcomes to those from donors without AKI.^{25,27–29} However, the risk of graft failure increases with the severity of AKI, with a higher risk of delayed graft function (DGF) in more severe AKI stages.²⁰ The Indian Society of Critical Care Medicine (ISCCM) recommends KT from DDs with AKI in selected cases, with decisions based on the AKI stage and procurement biopsy results ([Fig. 1A](#)).¹⁰ According to the new Organ Procurement and

Transplantation Network guidelines, procurement biopsies should be conducted on all deceased donors (DDs) with AKI that meet the specified criteria in [Supplementary Table S3](#).³³ If biopsy is not feasible, decisions should be based on clinical severity, degree of oliguria, and dialysis need.²⁸ Kidneys from small paediatric donors with AKI also show high non-utilisation rates, but studies suggest they can be used for KT in children, with similar long-term outcomes.^{34,35} Experts recommend using a scoring system like the Maryland Aggregate Pathology Index (MAPI) to assess kidney quality before transplant.^{36,37} MAPI, based on histological features, predicts graft survival and is recommended for use in India. A low MAPI score (<7) correlates with a 90% chance of graft survival^{36,38} ([Supplementary Table S4](#)).

Deceased donors of extremes of age (<12 years to >65 years)

The age cut-off for categorising elderly donors varies by country. Given that the Government of India's 2023 "One Nation, One Policy"⁶ removed the 65-year age limit for receiving DD organ transplantation, ISOT decided to use the same cut-off of >65 years to categorise elderly recipients. A systematic review of eight nonrandomised comparative studies ($n = 4376$ recipients of DD liver transplant [DDLT]) reported that donors of 79.9% of the grafts were <70 years old and 20.1% were >70 years old.³⁹ One-year graft and recipient survival were similar between the two groups ($P = 0.11$ and $P = 0.54$, respectively). However, three and five-year graft survival ($P = 0.006$ and $P < 0.0001$, respectively) and patient survival ($P = 0.007$ and $P < 0.0001$, respectively) were better for the >70-year-old group. The rates of biliary or vascular complications or delayed/loss of graft function were not statistically different between the groups.³⁹ The systematic review concluded that liver transplant from >70 years old DD was feasible with good functional outcomes. Single-centre retrospective studies conclude that very advanced age (≥ 70 –75 years) should not be an exclusion criterion for organ donation (liver, kidney, and dual kidney transplant [DKT]).^{40–42} The ISCCM recommends that DKT and liver donations should be accepted from ECD >70 years for recipients whose outcome is poor without organ transplants.¹⁰

The major challenge in paediatric deceased donor programs, especially for neonates and infants, is the timely and correct declaration of brain death using neurological criteria.^{7,9,43,44} This often leads to the loss of potential paediatric donors, and consequently, more patients in the paediatric age group with end-stage organ disease are likely to die while waiting for an organ.^{7,43,44} Kidney transplant programs often do not use kidneys from paediatric donors weighing <10 kg due to increased risk of vascular and urological complications and delayed graft function. However, a retrospective

19 statements accepted as consensus, where ISOT suggests that:	Level of agreement ^a	
	Strongly agree	Agree
Donors with acute kidney injury (With or without dialysis)		
Statement 1: The 'Organ Procurement and Transplantation Network's minimum kidney donor criteria' should be followed to decide if deceased donors with acute kidney injury should undergo procurement biopsy to assess suitability for organ transplant.	28%	47.4%
Statement 2: Kidneys from deceased donors recovering from acute kidney injury (according to KDIGO criteria) or having stage 1 kidney injury do not require procurement biopsy and are suitable for kidney transplant for patients with end stage kidney disease.	36.5%	36.5%
Statement 3: Kidneys from deceased donors with stage 2 and stage 3 acute kidney injury (according to KDIGO criteria) should be evaluated with procurement biopsy to see if they are suitable for organ transplant for patients with end stage kidney disease.	36%	40%
Statement 4: Kidneys from deceased donors with acute kidney injury (according to KDIGO criteria) can be used for kidney transplant for patients with end stage kidney disease, provided there is no or <10% cortical injury/necrosis, no acute cortical patchy necrosis and no thrombotic microangiopathy.	32.3%	46.8%
Deceased donors of extremes of age		
Statement 5: Age of the deceased donor should not influence decision to harvest the normal functioning organ.	54.9%	39.2%
Malignancy in deceased donors		
Statement 6: Deceased donors with history of malignancy can be considered for organ donation after careful assessment of the cancer transmission risk; those with no/minimal risk are fit for donation; those with high risk (including active malignancy) are unfit for donation; careful risk-benefit analysis should be carried out in those with intermediate transmission risk.	39.1%	43.5%
Deceased donors with diabetes and/or hypertension		
Statement 7: Deceased donors with diabetes and/or hypertension should be considered for organ donation, including kidney and heart, for patients with end stage organ failure. Careful evaluation of such donors is recommended including evaluation for retinopathy, nephropathy & cardiac involvement. If necessary, procurement biopsy should be considered to decide about appropriate organ allocation	36.2%	48.9%
Deceased donors with infection (HBV, HCV, HIV, Pneumonia and tropical diseases)		
Statement 8: Organs from anti-HBc-positive deceased donors can be transplanted in both HBV-negative and HBV-positive recipients. Organs from HBsAg positive deceased donors can be transplanted in HBsAg positive and negative recipients. Prophylaxis should be started in HBV-negative recipients. Antiviral therapy should be started in recipients testing HBV positive.	32.6%	45.7%
Statement 9: Organs from HCV-positive deceased donors can be transplanted in both HCV-negative and HCV-positive recipients. Antiviral therapy should be started in recipients testing HCV positive. There are currently no recommendations for prophylactic therapy for HCV-negative recipients. Prophylaxis for HCV negative recipients may be started at the discretion of the treating doctor after detailed risk benefit analysis	45.7%	41.3%
Statement 10: Organs from HIV-positive deceased donors can be transplanted in HIV-positive recipients with end stage organ failure provided there are no opportunistic infections. The HIV positive recipient should have a CD4 T-cell count of >100 cells per µL for liver and >200 cells per µL for kidney transplant and should receive appropriate antiretroviral therapy.	45.7%	47.8%
Statement 11: Multi drug resistant (MDR) Gram negative bacteria (GNB) should be ruled out in all donors with potential infection at the time of identification as a potential deceased donor and/or at retrieval. ISOT suggests against using organs from deceased donors with MDR GNB infections due to high risk of transmission resulting in adverse outcomes in the recipients.	44.4%	42.2%
Statement 12: Deceased donor with pneumonia without bacteraemia, should be considered for donation of all organs, except lung, with antibiotic cover against donor isolated pathogen in the recipient.	27.9%	46.5%
Statement 13: Organs from deceased donors with active tropical infections such as dengue fever, malaria and leptospirosis should not be accepted. Deceased donors (for organ donation) and recipients for organ transplants from deceased donors may be considered 30 days after treatment and resolution of dengue infection; and three months after treatment and resolution of malaria or leptospirosis.	27.5%	42.5%
Deceased donors with past and active tuberculosis		
Statement 14: Organs from deceased donors with active tuberculosis, disseminated TB, radiologically confirmed TB, past history of incompletely treated TB, high suspicion of active TB, central nervous system TB, or completely treated TB with positive acid-fast bacillus smear or molecular test should not be accepted. Deceased donors with lungs and other organs with significant residual damage from prior TB should be rejected.	42.5%	42.5%
Statement 15: Organs from deceased donors with past history of completed tuberculosis treatment, who recovered after treatment and had negative or pending results for acid fast bacillus smear or molecular tests, may be considered for organ donation after explaining the risks to the recipients	30.8%	61.5%
Statement 16: Organs from deceased donors with latent tuberculosis infection (LTBI) should be accepted on case-by-case basis based on treatment profile (treated, not treated, incompletely treated), epidemiological risk profile, and presence of residual lesions on chest X-rays. Recipients receiving organs from deceased donors with incomplete treatment information should receive anti-tubercular chemoprophylaxis. They should undergo biochemical/clinical/radiological monitoring for developing active TB. Recipients of organs from deceased donors with completed LTBI treatment do not require anti-tubercular chemoprophylaxis.	18.4%	60.5%
Kidney donation from deceased donors: surgical issues		
Statement 17: Normal functioning kidneys from deceased donors with urolithiasis (<4 mm) can be used for transplant with renal stones in situ.	27.8%	61.1%
Statement 18: Large renal stones (≥4 mm) or large isolated cysts (≥2 cm) in the deceased donor can be removed before transplant.	30.6%	58.3%
Statement 19: Normal functioning kidneys from deceased donors with horse-shoe kidney can be used for transplant. Urinary tract infection should be ruled out; if present, donor should be treated with organism-specific treatment, and prophylactic coverage administered to the recipient. Donor kidneys should be evaluated for ureteropelvic junction obstruction and renal calculi, and a surgical opinion should be sought regarding feasibility of transplant.	30.6%	55.6%

CT, computed tomography; DD, deceased donor; HbsAg, hepatitis B surface antigen; HBV, Hepatitis-B Virus; HCV, Hepatitis C Virus; HIV, Human Immunodeficiency Virus; ISOT, Indian Society of Organ Transplant; KDIGO, Kidney Disease Improving Global Outcomes; TB, tuberculosis. ^aAny statement that received ≥70% "Strongly Agree" or "Agree" votes was accepted as the consensus.

Table 2: Consensus statements overview.

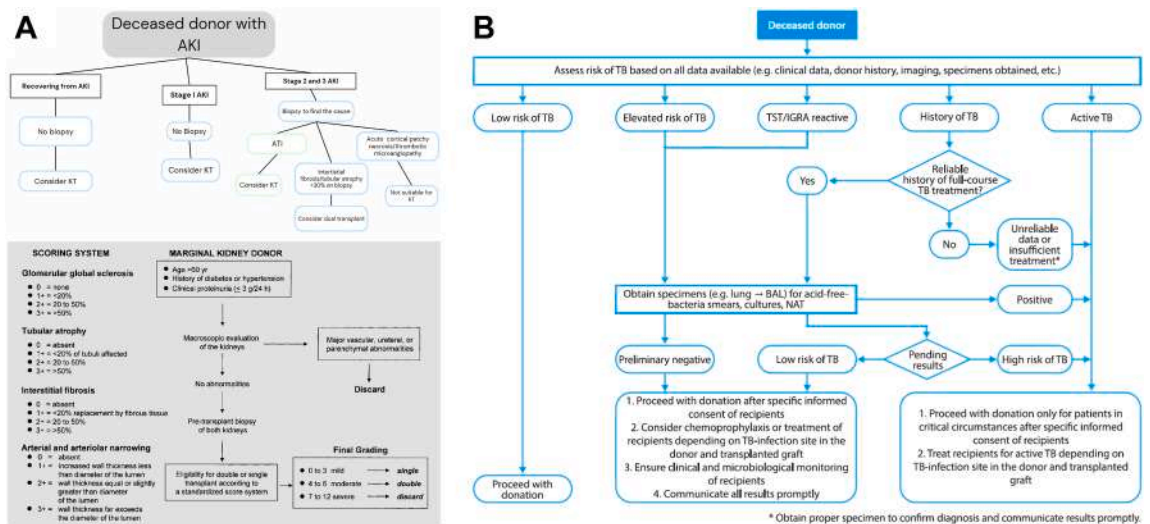


Fig. 1: A: Evaluation of deceased donor with acute kidney injury for kidney donation.^{28,30,31} B: Algorithm for management of deceased donors for suspected risk of infection with tuberculosis.³² Abbreviations: AKI, acute kidney injury, ATI, acute tubular injury, KT, kidney transplantation.

study found that graft survival (90% vs. 100%; $P = 0.09$) and patient survival (96.7% vs. 100%; $P = 0.48$) rates were similar between the <10 kg and >10 kg groups. There were no significant between-group differences for serum creatinine at 1, 3, or 5 years. However, the re-operation rate was higher in the <10 kg group (23.3% vs. 6.25%; $P = 0.03$).⁴⁵ Further, en-bloc kidney transplant is preferred in paediatric patients due to superior graft and recipient survival compared to “single kidney allocation”.^{45,46} A registry-based study showed that en-bloc kidney transplant recipients had superior 10-year patient survival (89.0% vs. 80.4%; $P = 0.04$) and graft survival (51.6% vs. 39.9%; $P = 0.04$) rates compared to remaining on the waiting list.⁴⁶ However, the technical difficulties of an en-bloc transplant and the increased anastomosis time should be kept in mind when considering such donors.

Malignancy in deceased donors

Donor-origin cancers (DOC) are rare but significant considerations in deceased donor (DD) transplantation. They include donor-transmitted cancer (DTC)—typically detected within six months post-transplant—and donor-derived cancer (DDC), which develops later in the graft.^{47–51} While DOC incidence is low (0–0.1% to 41.9%),^{47,49–51} the risk varies with tumour type, histology, stage, and disease-free interval.⁴⁹ Accurate risk assessment is essential to avoid both missed transplant opportunities and inadvertent high-risk transplants.⁵² Risk stratification has been developed by the OPTN/UNOS DTAC Malignancy Subcommittee, categorising malignancies into absolute contraindications, intermediate risk, and acceptable risk (Supplementary Tables S5–S7).^{10,12,48,49,52–54}

- Aggressive or active malignancies are an absolute contraindication to donation.
- Localized, non-aggressive malignancies may be considered with minimal risk of transmission (Table 3).^{49,51,53,54}
- Intermediate-risk tumours should be evaluated only for recipients with high mortality risk without transplant.^{12,49,53}

In practice, incomplete medical histories and limited time for donor evaluation may challenge accurate cancer risk assessment.⁵² Nevertheless, when assessed appropriately, the mortality risk from DOC is low, and the benefit of transplantation outweighs the risk, especially for critically ill recipients.^{49–54,56}

Deceased donors with diabetes and/or hypertension

Diabetes and hypertension are common comorbidities in deceased donors and may impact organ quality due to associated vascular and parenchymal changes.^{27,57,58} While Indian data are lacking, international registries report hypertension in 15–20% and diabetes in 2–8% of deceased donors.^{59–61} Evidence from the US Renal Data System (USRDS)⁵⁹ and the United Network of Organ Sharing (UNOS)^{62–65} databases suggests minimally increased risk of primary non-function, acute rejection, or delayed graft function (DGF) and marginally lower graft survival from such donors, particularly in kidney transplantation. Notably, recipient survival remains largely unaffected outcomes from standard criteria donors (SCD) with diabetes often exceed those from expanded criteria donors (ECD) without diabetes.^{66,67} Small studies suggest that early diabetic changes in donor kidneys may be reversible post-transplant,

Very low risk for transmission (<0.1%)	Low risk for transmission (≥0.1–<2%); use in recipient with significant risk without transplant
<ol style="list-style-type: none"> 1) Basal cell carcinoma of skin 2) Squamous cell carcinoma of skin with no metastasis 3) In situ carcinomas of: <ul style="list-style-type: none"> • Skin (nonmelanoma) • Cervix • Vocal cord 4) Superficial (noninvasive) papillary carcinoma of bladder (TONOMO) (nonrenal transplant only) 5) Solitary papillary thyroid carcinoma, ≤0.5 cm 6) Minimally invasive follicular carcinoma, thyroid, ≤1.0 cm 7) (Resected) well differentiated solitary renal cell carcinoma, ≤1.0 cm, (Fuhrman grade 1–2) 8) History of stage IA oestrogen receptor negative with curative surgery and cancer free >10 years 9) History of stage IA (pT1 or pT2, N0) colorectal adenocarcinoma with curative surgery and cancer free >5 years 10) Prostate cancer (Gleason ≤7) with curative treatment and cancer free >5 years 	<ol style="list-style-type: none"> 1) (Resected) solitary well differentiated renal cell carcinoma, >1.0 cm ≤ 2.5 cm, (Fuhrman grade 1–2) 2) Low grade CNS tumour (WHO grade I or II) 3) Primary CNS mature teratoma 4) Solitary papillary thyroid carcinoma, 0.5–2.0 cm 5) Minimally invasive follicular carcinoma, thyroid, 1.0–2.0 cm 6) History of treated non-CNS malignancy (≥5 years prior) with >99% probability of cure

Table 3: Deceased donors with malignancies considered fit for organ donation.^{12,49,53–55}

especially in non-diabetic recipients.²⁷ The overall benefits of transplantation outweigh the risks of remaining on dialysis. The expert panel supports the selective use of organs from deceased donors with diabetes and/or hypertension, with individualised risk assessment based on organ function and recipient profile (Table 4).^{36,37}

Deceased donors with infection

The South Asian Transplant Infectious Disease Guidelines recommend routine screening of all deceased donors for Hepatitis B Virus (HBV) infection.⁷⁰ Active HBV infection is marked by the presence of HBV DNA, HbsAg, and HbeAg. Isolated HBV core antibody (anti-HBc) positivity without HbsAg indicates resolved or resolving HBV infection or occult chronic HBV infection.⁷¹ The risk of HBV transmission from anti-HBc-positive donors to recipients can be minimised by appropriate antiviral management and monitoring. Due to limited clinical experience with HBV-positive donors who have active infection (typically HbsAg-positive, as routinely seen by many centres), solid organ transplants from these donors are generally avoided.^{10,71} However, the literature suggests that livers from HbsAg-positive donors can be safely transplanted into HbsAg-positive recipients without a significant increase in morbidity and mortality.^{72–74} A literature review also indicated that kidney transplantation (KT) from HbsAg-positive donors were safe and feasible for recipients, regardless of the recipients' HbsAg status.⁷⁵ Nevertheless, appropriate antiviral management and monitoring are required in such cases.^{72–75}

A systematic review of 39 studies over 15 years, involving 903 recipients of liver grafts from HBV core antibody (anti-HBc) positive donors, concluded that livers from anti-HBc-positive donors can be safely

transplanted into recipients, irrespective of their HBV status. However, transplants should preferentially be offered to recipients who are HbsAg-positive or anti-HBc/hepatitis B surface antibody (anti-HBs) positive. Anti-HBc/anti-HBs-positive recipients may not require prophylaxis, whereas prophylaxis with lamivudine is considered mandatory for HbsAg-negative recipients.⁷⁶ The Indian Society of Critical Care Medicine (ISCCM) recommends that liver transplants from B serology-positive deceased donors (except for HbsAg-positive donors) with resolved HBV infection (anti-HBc-positive ± anti-HBs) can be considered for donation to HBV carriers with minimal risk, after implementing specific antiviral therapy.¹⁰ However, the American Society of Transplantation (AST) suggests that deceased donors who are isolated anti-HBc-positive can be considered for organ donation for all recipients,

- >55 years^a
- should be NIIDM
- ≤2 oral GLD
- DM duration >3 years^a
- Non-smoker
- No hypertension^a
- BMI <30 kg/m^{2a}
- Normal fundus exam
- No evidence of end-organ/diabetic complications
- If hyperlipidaemia, should be well-controlled
- Urine albumin-creatinine ratio <30 mg/g or urine protein-creatinine ratio <200 mg/g
- HbA1c <7% on ≥three occasions in past two years
- GFR ≥80 ml/min
- FBS ≥126 mg/dl (7.0 mmol/L) ≥two occasions (or 2-h glucose with OGTT <200 mg/dl (11.1 mmol/L))
- Controlled hypertension (no consensus on upper level of cut off)
- Normal organ function

BLI, body mass index; DM, diabetes mellitus; FBS, fasting blood glucose; GFR, glomerular filtration rate; GLD, glucose lowering drug; HbA1c, glycated haemoglobin; NIIDM, non-insulin dependent diabetes mellitus; OGTT, oral glucose tolerance test. ^aDonors not meeting these criteria can also be considered for organ donation on a case-to-case basis.

Table 4: Eligibility criteria for selecting deceased donor with diabetes and/or hypertension.^{68,69}

irrespective of their HBV status. AST further noted that the risk of HBV transmission from isolated anti-HBc-positive deceased donors to recipients is highest for liver recipients but significantly lower for recipients of other solid organ transplants. Prophylaxis can significantly reduce the risk of HBV transmission. Furthermore, even if HBV is transmitted, it can be effectively managed with antiviral treatment.⁷¹

Organs offered by HCV-positive deceased donors are often declined due to the positive virology, even though the quality of the organs is comparable to those transplanted from HCV-negative donors. HCV-positive deceased donors can provide organs, as effective antiviral therapy is now available for treating HCV.^{70,77,78} The HCV virus spontaneously clears without treatment in 10%–25% of HCV-infected patients. Additionally, HCV treatment does not significantly increase the cost for the transplant recipient.⁷⁷ The risk of transmission depends on the level of viraemia, which can be assessed by both serology and nucleic acid testing (NAT). Transmission risk is better assessed with NAT, as it helps detect HCV RNA in the donor's blood. NAT-positive deceased donors have a higher risk of transmission, whereas NAT-negative donors are less likely to transmit HCV.⁷⁷ The South Asian Transplant Infectious Disease Guidelines recommend routine HCV NAT in deceased donor transplants, as HCV antibody seroconversion may take more than a month if the infection is in the window period.⁷⁰ A survey of physicians involved in US kidney transplant programs indicated that using kidneys from HCV-positive donors, whether HCV-positive or negative recipients, reduced the waiting time by at least 18 months.^{78–81} Moreover, large registry-based or retrospective studies have shown that the donor's HCV-positive status does not negatively affect recipient or graft survival in HCV-negative recipients.^{78,79,82,83} Graft and recipient survival in HCV-negative recipients of organs from HCV-positive deceased donors is similar to that from HCV-negative deceased donors.⁷⁹ The ISCCM recommends considering liver transplants from an HCV-positive deceased donor for HCV-positive recipients after implementing specific antiviral therapy.¹⁰ However, Australian guidelines and a physician survey in the US recommend that organs from HCV-positive deceased donors can be harvested for HCV-uninfected recipients.^{12,81} Proper antiviral therapy should be initiated in recipients who are HCV-positive or become HCV-positive post-transplant.^{12,70,81}

The HIV Organ Policy Equity (HOPE) Act in the United States allows organ transplantation from deceased HIV-positive donors to HIV-positive recipients (HIV D+/R+) who have end-stage organ failure.⁸⁴ The HOPE Act recommends that there should be no evidence of invasive opportunistic complications of HIV infection in deceased donors (DDs), and the results of pre-implant donor organ biopsy should be

available.⁸⁵ The HOPE Act does not recommend viral load assessment in HIV-positive DDs. In cases where the donor has a known history of HIV and prior antiretroviral therapy (ART), post-transplant ART should be explained to the recipient. For liver transplants from HIV-positive donors, the recipient should have a minimum CD4 T-cell count of >100 cells per μL for liver and >200 cells per μL for kidney transplants.⁸⁵ Real-world literature shows that deceased donor kidney transplantation (DDKT) from HIV D+/R+ had similar recipient and graft survival rates, as well as similar HIV and viral load outcomes, when compared to DDKT from HIV-negative donors to HIV-positive recipients.^{86,87} A prospective nonrandomized study showed that the survival rates for HIV-positive recipients (R+) at one, three, and five years after DDKT were 84%, 84%, and 74%, respectively. The graft survival rates were 93%, 84%, and 84%, respectively.⁸⁸ This suggests that HIV D+/R+ organ transplantation is a feasible option for recipients with end-stage organ failure.^{84,86,87} However, the Indian Society of Critical Care Medicine (ISCCM) recommends against using liver from HIV-positive deceased donors.¹⁰ Organ donation from deceased HIV-positive donors to HIV-negative recipients is not well studied and carries numerous ethical and clinical implications.

Multi-drug-resistant (MDR) infections are a common finding in deceased donors (DDs).^{89–93} The greatest concern lies with donor bacteraemia caused by MDR organisms such as methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-resistant *Enterococcus* (VRE), and MDR Gram-negative bacteria (MDR-GNB), which are resistant to most antimicrobial agents. There have been documented cases of donor-derived transmission and adverse outcomes in recipients.^{32,94–97} Literature shows that MDR-GNB infections in DDs pose a significant risk for transmission and lead to adverse outcomes in transplant recipients, as these infections are difficult to control.^{89,92,97} Therefore, experts suggest that DDs with MDR-GNB infections should not be accepted for organ donation. One study found that the risk of MDR infection in donors was significantly associated with several donor characteristics, including hepatitis C viraemia ($P = 0.002$), dialysis requirement ($P = 0.037$), prior haematopoietic cell transplant ($P = 0.047$), and use of antibiotics with a narrow Gram-negative spectrum ($P = 0.045$).⁹⁰ The experts recommended that blood cultures should be performed on the donor at the time of identification as a potential donor and/or at the time of organ retrieval. They also suggested that blood cultures should be performed on the recipient at the time of transplant and weekly thereafter until the cultures become negative.

A retrospective study reported nine successful heart transplants from donors who had died from severe septic shock, meningitis, and/or pneumonia. The study found no evidence of donor-transmitted infection,

sepsis, or rejection; allograft dysfunction in three recipients resolved posttransplant; and long-term graft function remained excellent for all grafts.⁹⁸ A literature review pointed out that the risk of donor-transmitted pneumonia is negligible with appropriate antibiotic coverage for the recipient.⁹⁹ The 2022 European Directorate for the Quality of Medicines (EDQM) consensus on donor selection in infectious conditions recommend that DD with pneumonia and no bacteraemia can donate all organs.

South Asian countries like India are endemic to tropical infections such as dengue fever, malaria, and leptospirosis. The South Asian Transplant Infectious Disease Guidelines recommend that all potential DD and recipients with fever or recent history of fever should be screened for dengue fever, malaria, and leptospirosis.⁷⁰ In endemic areas, organ donation from a living donor with leptospirosis or malaria is deferred for three months and for 30 days in a living donor with dengue after treatment and resolution of infection.⁷⁰ Active infection with leptospirosis, dengue or malaria is a contraindication for transplantation due to high risk of transmission. Literature on organ donation from DDs with active or past tropical infections like dengue, malaria, and leptospirosis is lacking. In theory, organ donation from DDs with leptospirosis or malaria should follow the same principles as living donors. Organ donation from DDs with active infection is contraindicated, but DDs who have recovered from these infections and have been infection-free for three months (for malaria and leptospirosis) or 30 days (for dengue) before death may be considered. Organs from DDs with symptoms suggestive of dengue or those who tested positive for dengue should be discarded.

In India, tuberculosis (TB) remains a significant public health issue, complicating organ donation practices. Deceased donors (DDs) with suspected or active TB pose a high risk of transmitting the infection to organ recipients, which can lead to graft failure or even death. Due to the difficulty of obtaining detailed medical histories from DDs, standard TB diagnostic methods such as the tuberculin skin test (TST) and interferon-gamma release assays (IGRAs) may not be practical or timely, particularly when a donor's history of TB treatment is unknown.^{32,70,98–102} Current guidelines recommend excluding organs from DDs with active TB, central nervous system (CNS) TB, or disseminated TB. TB in the donor can be suspected through radiological evaluations, such as chest X-rays, showing apical lesions, pleural thickening, or calcified nodules.^{70,100,101,103–105} If TB is suspected or the donor has a history of incomplete TB treatment, the use of organs should be considered cautiously, with the risk explained to the recipient and chemoprophylaxis initiated.^{32,101,105} Given the challenge of diagnosing latent TB infection (LTBI) in DDs, decisions should be made on a case-by-case basis, considering factors like epidemiological risk and donor

history.^{100–102,105} Chemoprophylaxis is recommended for recipients receiving organs from donors with LTBI or incomplete treatment histories.^{32,100,105} Enhanced screening and informed decision-making are critical in managing TB risks in organ donation in India. An algorithm for managing DDs with a potential risk of TB is outlined in Fig. 1B.

Kidney donation from deceased donors: surgical issues

Urolithiasis is relatively uncommon in deceased donors (DDs). Literature suggests that kidneys with incidental, small renal stones (<4 mm) can be used for kidney transplantation (KT) with stones in situ.¹⁰⁶ Larger stones (≥4 mm) in donors can be removed during back-table surgery after organ procurement, either through ex-vivo pyelolithotomy or semirigid/flexible ureteroscopy.^{106–108} A case series demonstrated successful KT into 17 recipients from 14 DDs with kidney stones identified during pre-donation evaluation.¹⁰⁷ Seven DDs had multiple stones (two to five) with diameters ranging from 8 to 12 mm, while another seven had a single stone ranging from 4 to 7 mm. Ex-vivo pyelolithotomy was performed before KT, and there were no incidences of acute rejection or graft dysfunction during a six-month follow-up.¹⁰⁷ Another case report described KT from a DD with three isolated large cysts (8, 4, and 2 cm in size), which were deroofed before transplantation.¹⁰⁹ Both the donor and the recipient were over 50 years old, and the recipient had a functioning graft post-transplant.

Deceased donor with horse-shoe kidney

Horse-shoe kidneys are an uncommon finding in DDs. Transplanting a horse-shoe kidney can be challenging due to its unusual vascular and urinary collecting systems.¹¹⁰ Therefore, horse-shoe kidneys are often discarded. However, several case series have shown successful en bloc transplantation of horse-shoe kidneys.^{110–113} Other case series report successful separation of the horse-shoe kidney into two separate units for transplantation into two recipients.^{113,114} Depending on the surgical anatomy, particularly the vasculature and thickness of the isthmus, the two renal units may be separated and implanted as single kidneys in two recipients. Both types of transplantation have been successful, with grafts remaining functional. Since ureteropelvic junction obstruction, renal calculi, and urinary tract infections are more common in horse-shoe kidneys compared with normal kidneys, these conditions should be identified.¹¹⁵ Renal calculi may be removed during bench surgery.

Limitations

The paper's strengths include its structured Delphi method, expert input, and contextual relevance to India and Asia, addressing gaps in donor suitability guidance. It aims to reduce organ discards and promote

self-sufficiency in transplantation. Limitations involve reliance on expert opinion, retrospective studies, and limited data for non-kidney transplants.

Conclusion

Organs from expanded criteria donors (ECDs) are often discarded without proper evaluation due to a lack of awareness that they can be viable for donation. The expert panel, based on existing evidence and clinical experience, emphasises the importance of considering this donor pool in order to reduce the waiting list for patients with end-stage organ disease. This consensus highlights the clinical scenarios in which organ donation from deceased marginal donors and other ECDs is feasible, and demonstrates that the graft and recipient survival rates are acceptable. The consensus further aims to help expand the organ donor pool, as the benefits of organ transplantation from these donors significantly outweigh the adverse outcomes of remaining on the waiting list.

Contributors

All authors have equal contribution in conceptualisation, data curation, formal analysis, funding acquisition, investigation, methodology, project administration, resources, software, supervision, validation, visualisation, writing—original draft, and writing and review & editing.

Declaration of interests

None.

Appendix A. Supplementary data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.lansea.2025.100628>.

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