Section IV: Malignancy

Introduction: Malignancy Risks After Kidney Transplantation

Kidney transplant recipients from around the world are at greater risk of developing cancer compared to the general population (Table 29). This is especially true for cancers associated with viral infections (e.g. EBV-associated lymphomas). Some cancers are common in the general population and also occur at a higher incidence in KTRs (e.g. colon cancer). Some are common in KTRs because they are common in the general population and have a similar incidence in KTRs (e.g. breast cancer). Others are rare, but occur at a substantially higher rate in KTRs (e.g. Kaposi sarcoma) (620,621). There are also cancers that may cause stage 5 CKD, and are therefore seen more commonly in KTRs (e.g. myeloma and renal cell carcinoma).

Cohort studies have demonstrated the variability of risk for cancer with both age and sex, with young KTRs having a risk 15–30 times greater than the general population of the same age, while the risk is only two times greater for 65-year-old KTRs (625). After the development of cancer, the survival of transplant recipients is poor, and treatment options are limited by the transplant or comorbidities. It is thus important to consider options for preventative measures and screening KTRs, which can theoretically deliver benefits of lower morbidity and mortality through reduced incidence or early interventions.

Table 29: Cancers categorized by SIR for kidney transplant patients and cancer incidence[a]

	Common cancers[b]	Common cancers in transplant population (estimated)[c]	Rare cancers[d]
High SIR[e] (>5)	Kaposi's sarcoma (with HIV)[e]	Kaposi's sarcoma[f] Vagina[f] Non-Hodgkin lymphoma Kidney Non-melanoma skin[f] Lip[f] Thyroid Penis[f] Small intestine[f]	Eye
Moderate SIR[e] (>1–5, $p < 0.05$)	Lung Colon Cervix Stomach Liver	Oro-nasopharynx Esophagus Bladder Leukemia	Melanoma Larynx Multiple myeloma Anus[f] Hodgkin's lymphoma
No increased risk shown[e]	Breast Prostate Rectum[f]		Ovary Uterus Pancreas Brain Testis

HIV, human immunodeficiency virus; SIR, standardized incidence ratio.
[a]In approximate descending order of estimated frequency (SIR × rate in general population).
[b]Incidence in both general and transplant population ≥10 per 100 000 people; based on world incidence (622). Age-standardized rate. Normalized to world population.
[c]Incidence in general population <10 per 100 000, but estimated incidence in transplant population (SIR × general population incidence) ≥10 per 100 000 people.
[d]Incidence in both general and transplant population <10 per 100 000 people.
[e]Excerpted from Table 4 of Grulich et al. (623).
[f]Based on US incidence (624). Age standardized rate (normalized to US population).

Rating Guideline Recommendations

Within each recommendation, the strength of recommendation is indicated as **Level 1**, **Level 2**, or **Not Graded**, and the quality of the supporting evidence is shown as **A**, **B**, **C**, or **D**.

Grade*	Wording
Level 1	'We recommend'
Level 2	'We suggest'

Grade for quality of evidence	Quality of evidence
A	High
B	Moderate
C	Low
D	Very low

*The additional category 'Not Graded' was used, typically, to provide guidance based on common sense or where the topic does not allow adequate application of evidence. The most common examples include recommendations regarding monitoring intervals, counseling, and referral to other clinical specialists. The ungraded recommendations are generally written as simple declarative statements, but are not meant to be interpreted as being stronger recommendations than Level 1 or 2 recommendations.