Ultrasound-guided percutaneous renal biopsy in children

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BACKGROUND

Ultrasound- guided percutaneous renal biopsy (PRB) with a core tissue sampling followed by pathohistological analysis is one of the most important tools for diagnosing renal diseases, providing prognosis and influencing therapeutic decisions. Firstly described in the early 1950s, following years of improvements and minimizing the complications, it remains the gold standard, due to its availability, real-time guidance and the absence of radiation for the patient. Nevertheless, this procedure isn't without risk.

RESEARCH QUESTION

The goal of this study is to investigate if the number of renal core samples has an impact on the number and severity of post-biopsy complications, the adequacy of renal tissue samples for pathological tests and the rate of concurrence between clinical and pathological diagnoses in children with PRB.

METHODS

- PRB pediatric patients
- clinical data obtained from electronic records
- from 1st of January 2012 – 31st of July 2021
- complications separated on minor and major depending on future engagement
- descriptive statistics analyzed using chi-squared test

RESULTS

- 223 PRB in 156 children

- 19% of all native and 65% of all transplanted kidneys had more than 1 PRB.

- Average age: 11.59 years (Me: 13.14 years, Min:0.07 years, Max: 21.61 years, SD: 5.61 years)

Three most common indications for PRB:
1. *Renal Graft Dysfunction* (19.28%)
2. *IgA nephropathy* (17.93%)
3. *Minimal change disease* (15.69%)

- **Only one** 2-year old child had a **major complication**; high-flow arteriovenous fistula (AVF) was created, which was treated conservatively and resulted in nephrectomy.

Overlay of minor complication and obtained quality samples with core samples:
1. One core sample ➔ 94.87% of all samples have excellent quality with 25.64% of cases developing at least one minor complication.
2. Two core sample ➔ 100% of all samples have excellent quality with 26.62% of cases developing at least one minor complication.
3. Three come sample ➔100% of all samples have excellent quality with 50% of cases developing at least one minor complication.
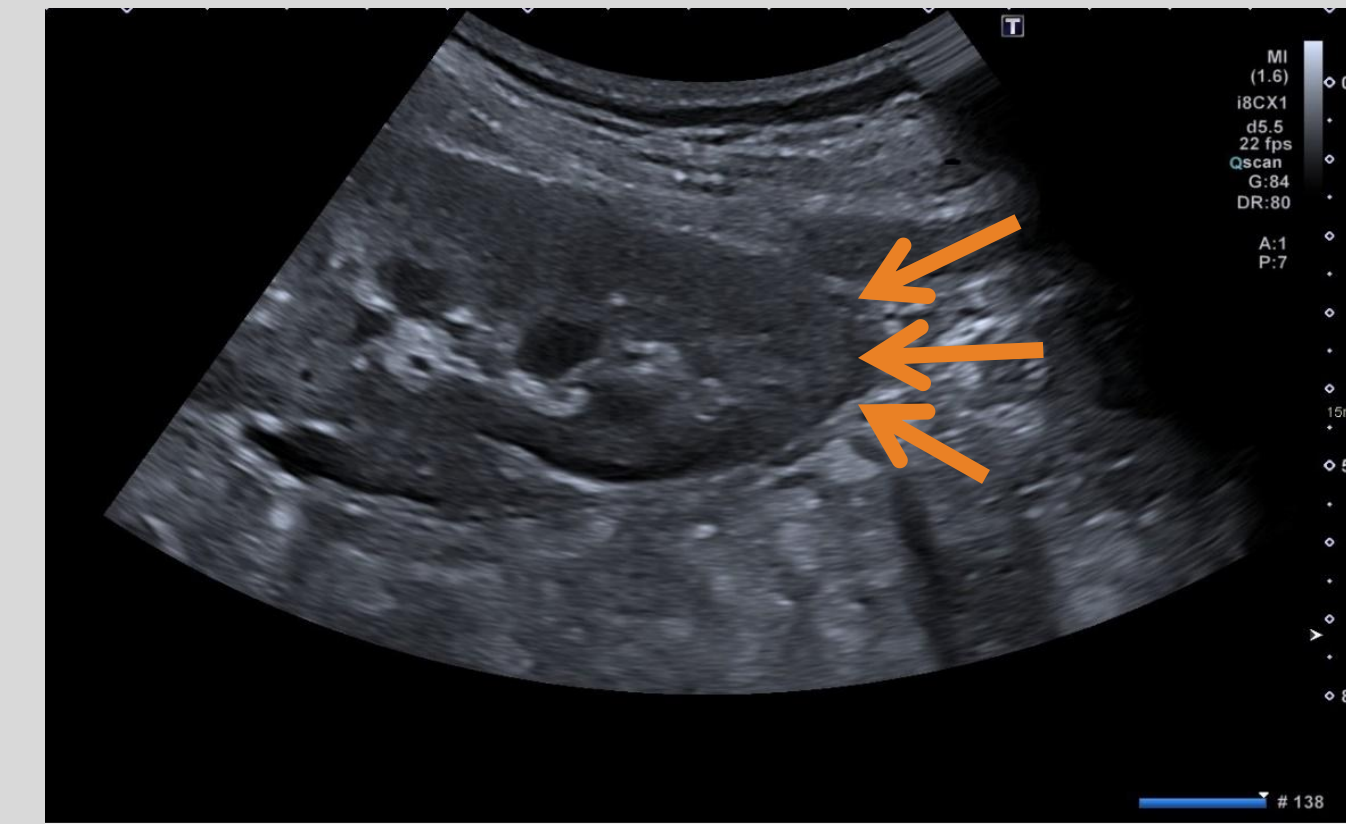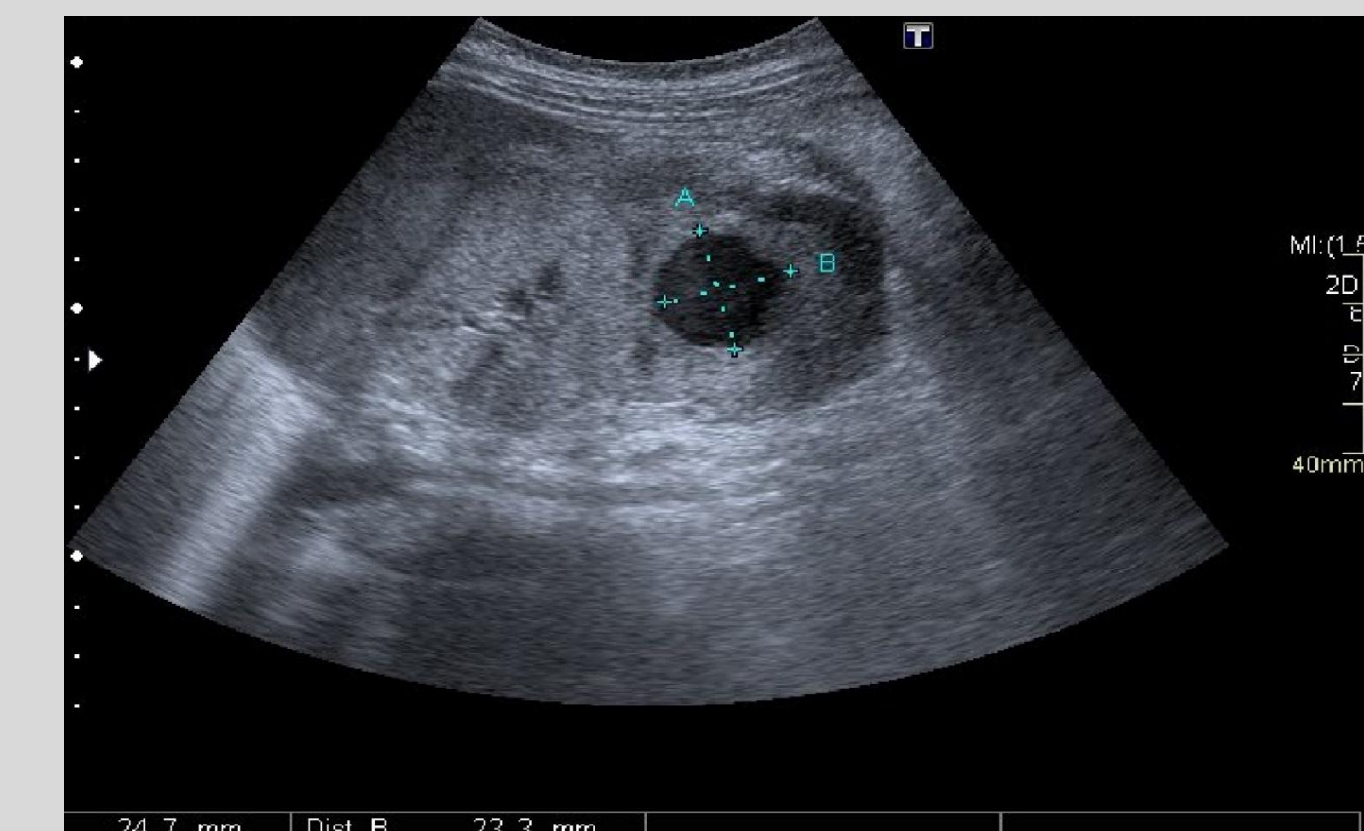

Img 1. Perirenal Hematoma (arrow)
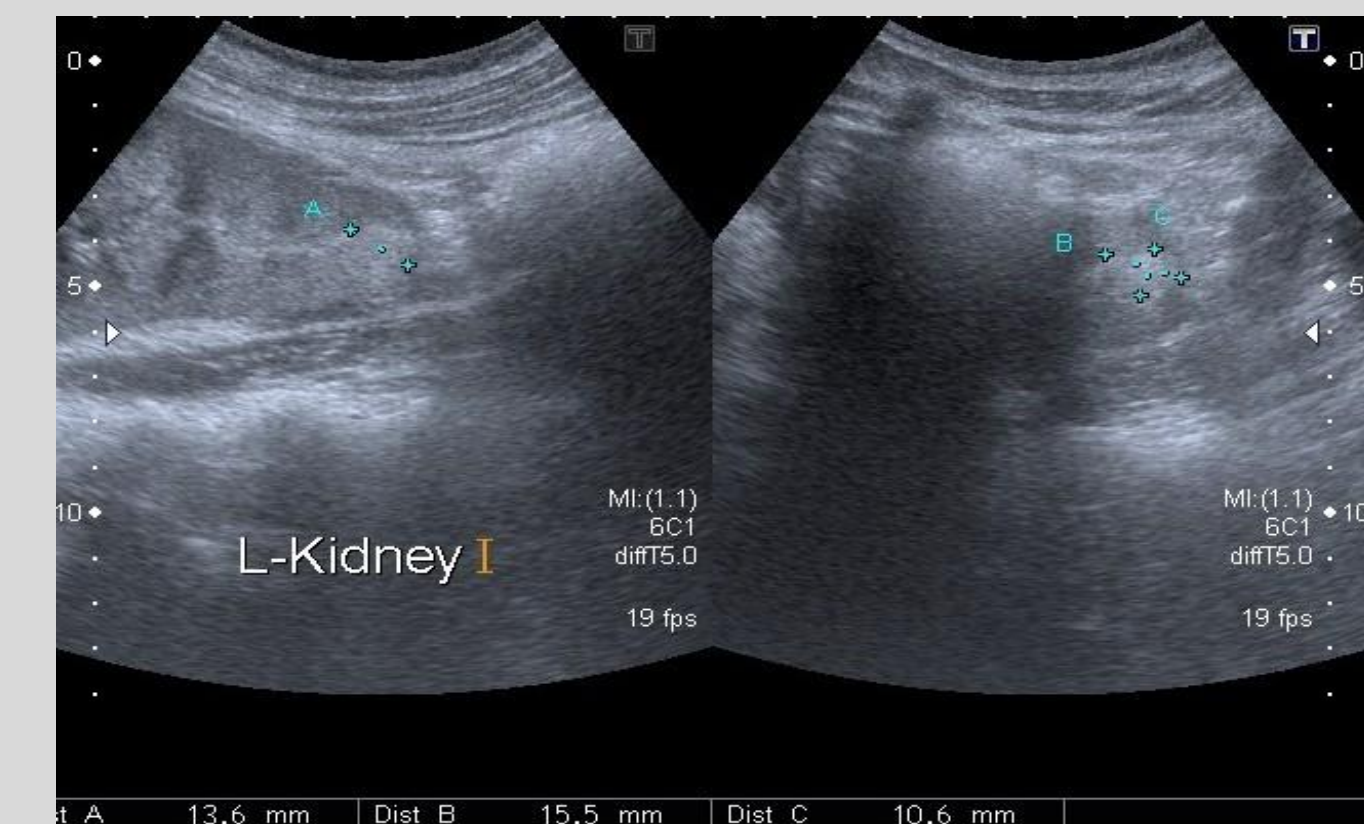
Img 2. Intrarenal hematoma after PRB in a 16-year old girl
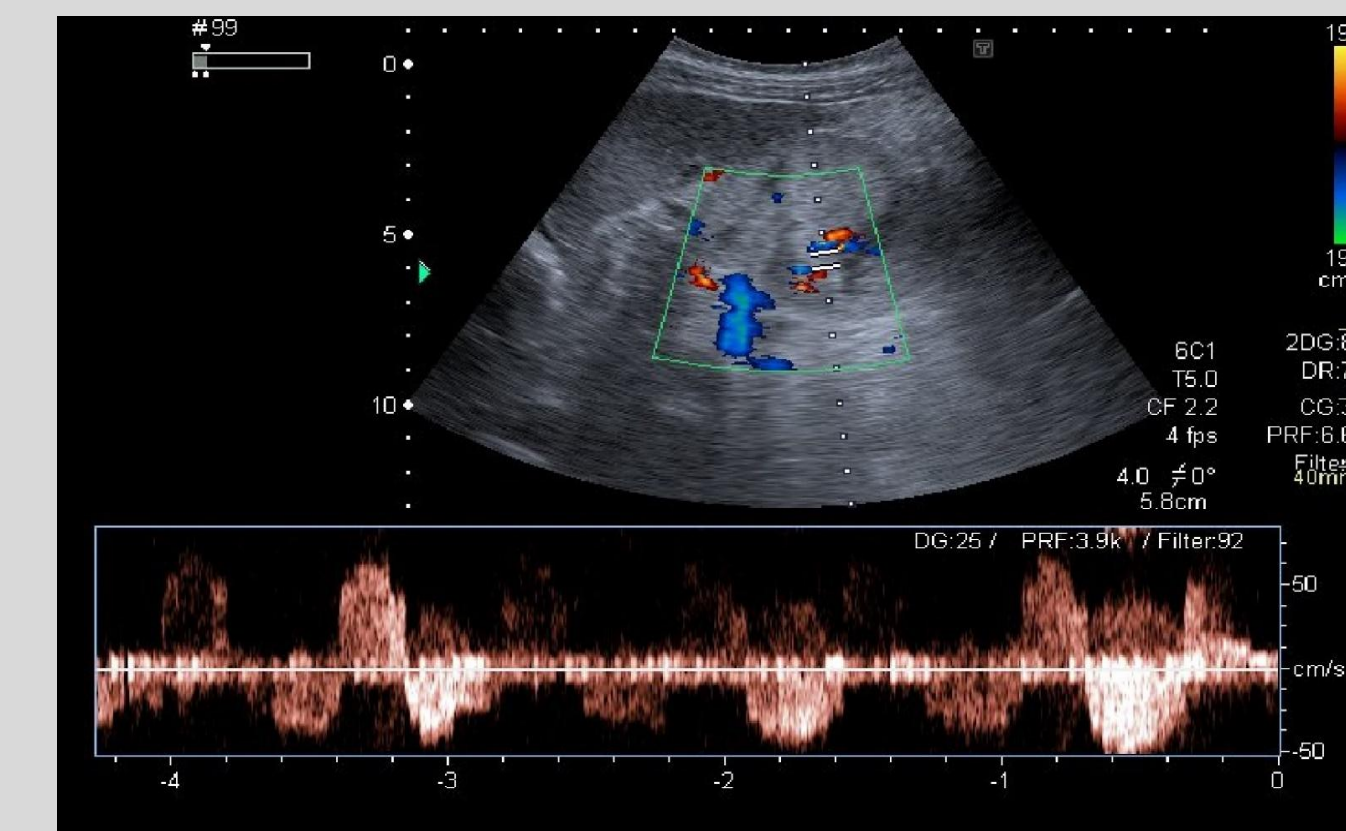
Img 3. AVF Doppler

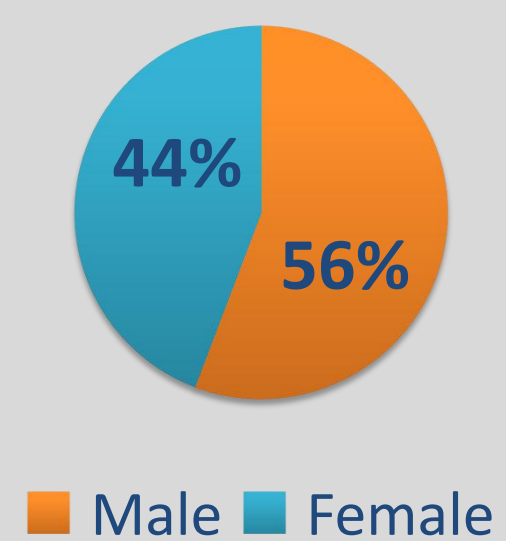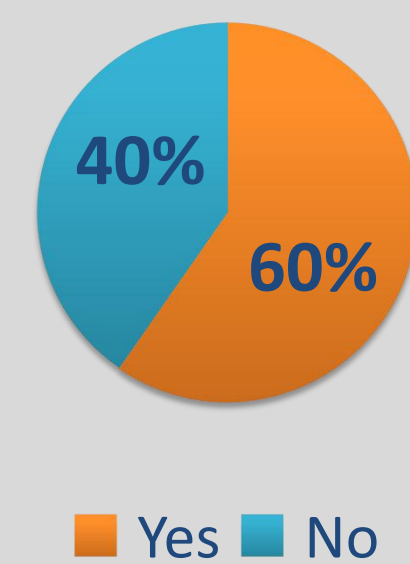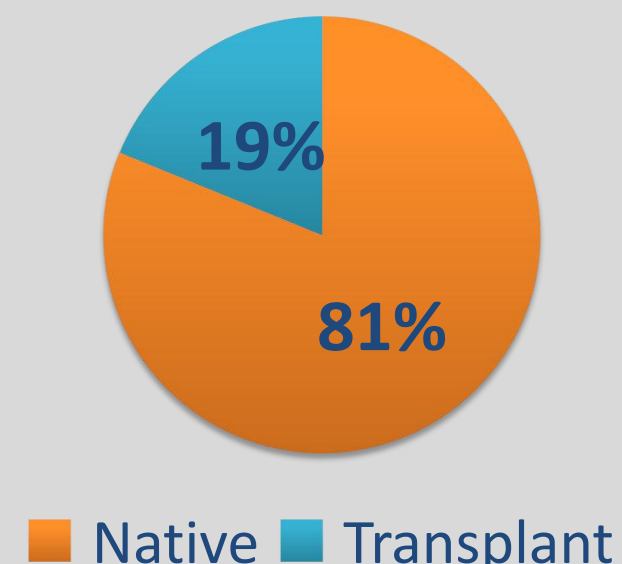Img 4. Arteriovenous fistula (AVF) in a 2-year old boy

Fig 1. Gender
44% Female / 56% Male
Male, Female

Fig 2. Sedation
40% No / 60% Yes
Yes, No

Fig 3. Kidney
19% Transplant / 81% Native
Native, Transplant

Fig 4. Kidney Side Biopsy
28% Right / 72% Left
Left, Right
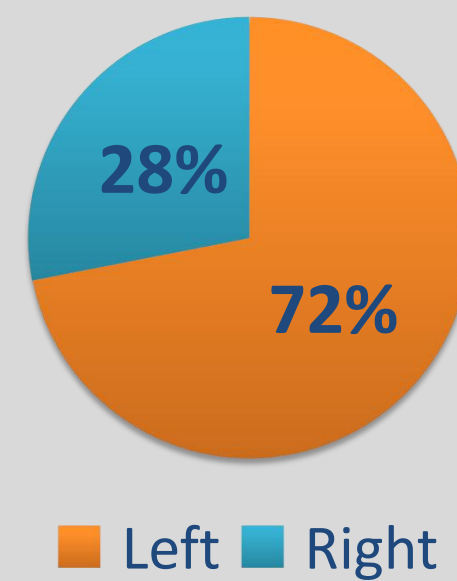
Fig 5. Concurrence between clinical and pathological diagnoses
18% No Match / 12% Semi Match / 70% Match
Match, Semi Match, No Match
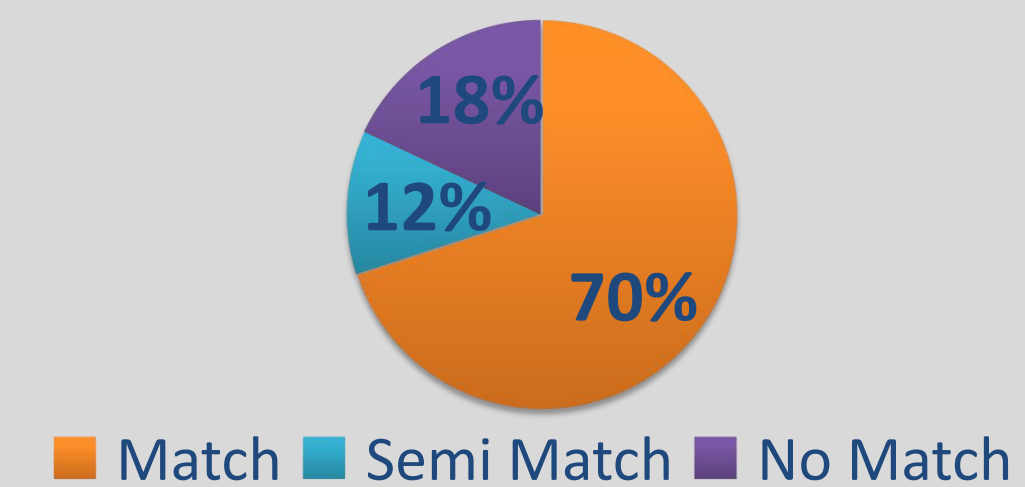
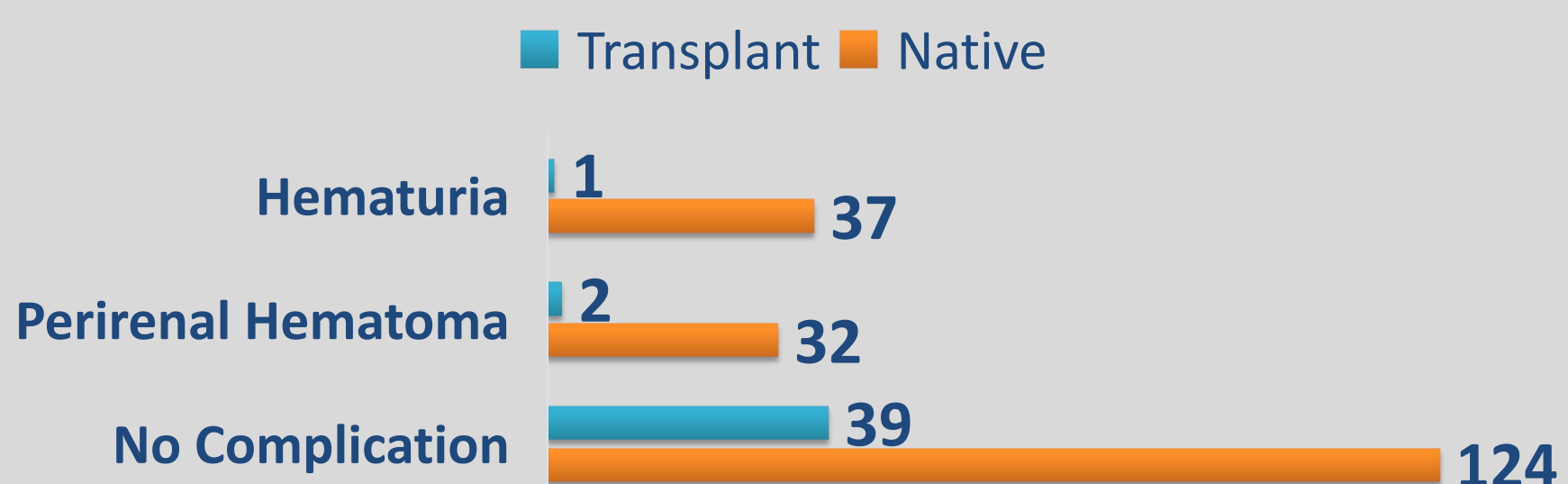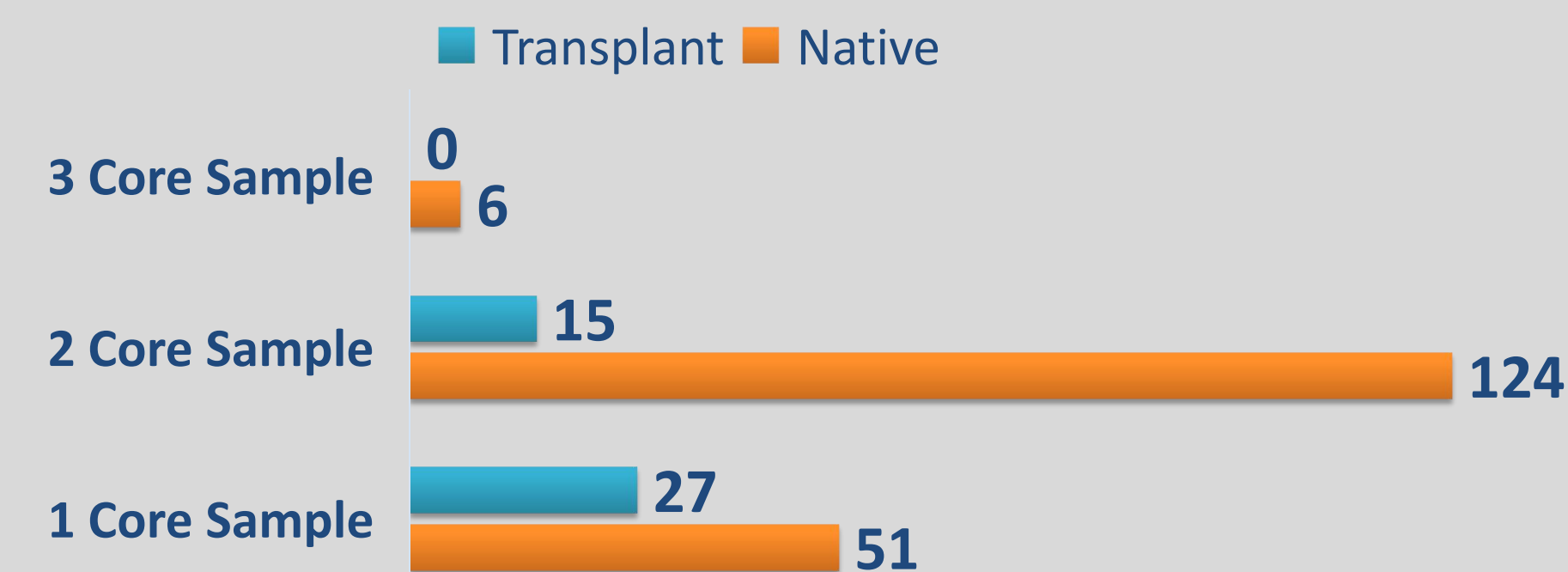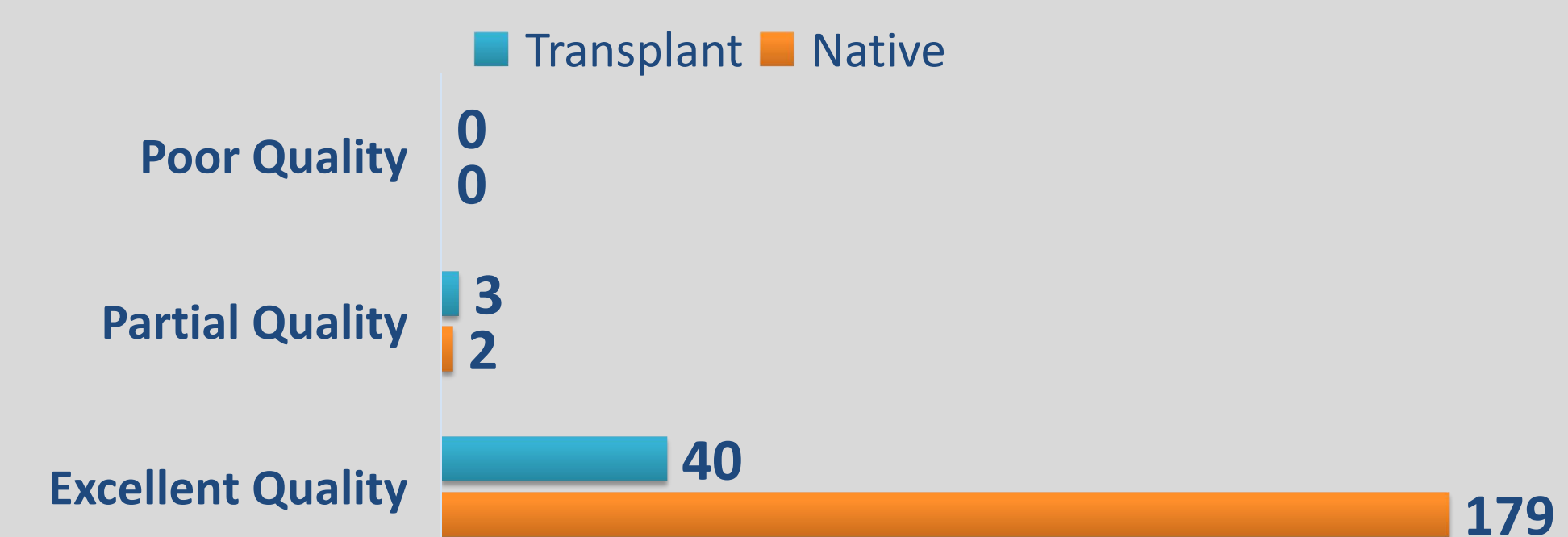## CONCLUSION

- There was no statistical correlation between the number of core samples and complications ($p > 0.1931$)
- When two core samples were taken quality sample for interpretation was reached in 100% of the cases, while in one core samples it was reached in 94.87%.
- The clinical and pathohistological diagnoses matched in 81.62% of the cases.

Fig 6. Minor Complications
Transplant, Native

	Transplant	Native
Hematuria	1	37
Perirenal Hematoma	2	32
No Complication	39	124

Fig 7. Core Samples
Transplant, Native

	Transplant	Native
3 Core Sample	0	6
2 Core Sample	15	124
1 Core Sample	27	51

Fig 8. Quality Sample
Transplant, Native

	Transplant	Native
Poor Quality	0	0
Partial Quality	3	2
Excellent Quality	40	179