

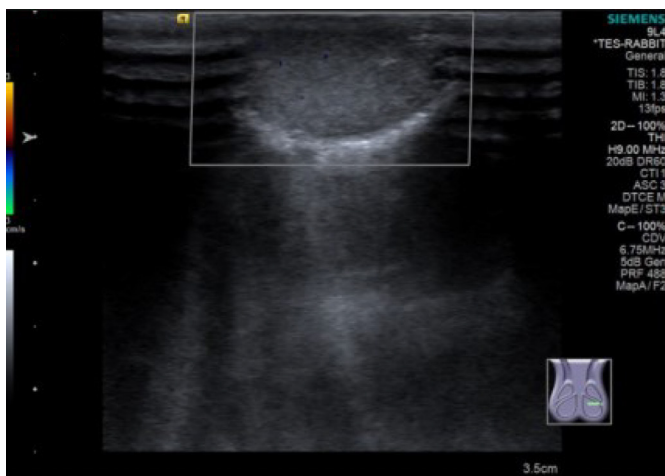
**Supplementary Table 1. Johnsen scoring system**

Scores	Histopathological features
10	Complete spermatogenesis with many spermatozoa. Germinal epithelium organized in a regular thickness leaving an open lumen.
9	Many spermatozoa present but germinal epithelium disorganized with marked sloughing or obliteration of lumen.
8	Only few spermatozoa (<5–10) present in section.
7	No spermatozoa but many spermatids present.
6	No spermatozoa and only few spermatids (<5–10) present.
5	No spermatozoa, no spermatids but several or many spermatocytes present.
4	Only few spermatocytes (<5) and no spermatids or spermatozoa present.
3	Spermatogonia are the only germ cells present.
2	No germ cells but sertoli cells are present.
1	No cells in tubular section.

**Supplementary Table 2. Histological changes of animals from complete and incomplete testicular torsion group**

Histological changes	Complete testicular torsion group (n=20)	Incomplete testicular torsion group (n=20)	Total animals (n=40)
Normal testicular spermatogenesis	0	0	0
Hyospermatogenesis	3 (15.0)	12 (60.0)	15 (37.5)
Spermatogenic arrest	16 (80.0)	8 (40.0)	24 (60.0)
Sertoli cell-only syndrome	0	0	0
Absence of seminiferous tubules	1 (5.0)	0	1 (2.5)

Values are presented as the number of animals (%).



**A**



**B**

**Supplementary Fig. 1. Representative images of ultrasonography in one rabbit with complete testicular torsion that is excluded.**

**A.** During the operation, color Doppler flow imaging shows that there is no blood flow signal in the torted testis (left). **B.** Testicular blood flow is restored after modeling.