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The Problem of Absorptive Function of the Seminal Vesicle

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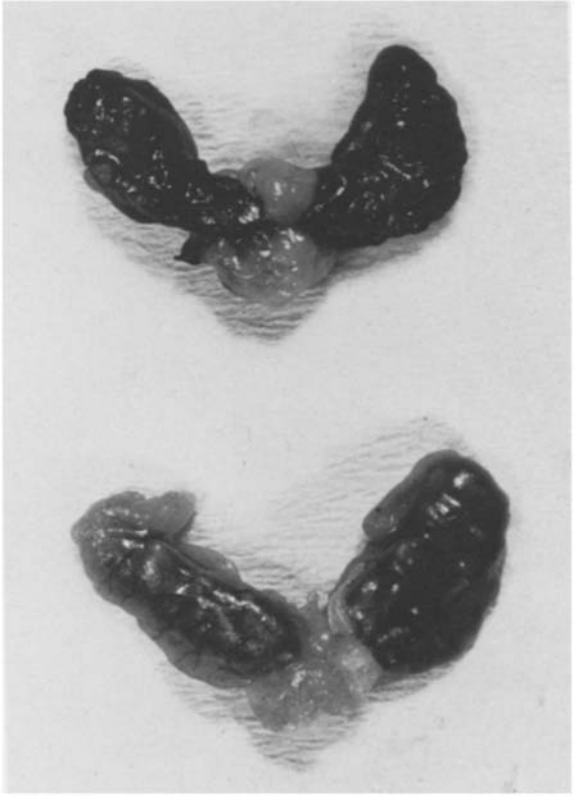
Summary. The problems concerning absorption and excretion by the seminal vesicle in the human and animals, were investigated by application of dye injection, ligation and seminal vesiculography. A water-soluble contrast medium could be observed in the seminal vesicle for only three days after injection in both human and rat. The oil contrast medium remained outlining the structure more than two weeks. Later it gradually disappeared over a period of two months. The ligated seminal vesicle of rats became swollen with storage of fluid inside one week after the operation. The dye injected preoperatively remained in a relatively large amount compared to the non-ligated side. The dye seemed to be mostly expelled with the bulk of seminal vesicular fluid on the non ligated side. However, the fact that there was a decrease of dye in the ligated side means coexistence of absorption as well as secretion. In this experiment secretory function seemed to be dominant. The results mentioned above indicate that the seminal vesicle has both abilities, i. e. absorption and secretion. The differences among the variable reports, obtained with the aid of X-ray techniques, might be due to the different nature of contrast media employed namely watersoluble and oily contrast medium.

Key words: Seminal vesicle, contrast medium, vasoligation.



Introduction

There is dispute as to the function of the seminal vesicle. Originally this organ was regarded as a reservoir for sperm, just as the urinary bladder is for urine. Beams and King (1), however, disputed the evidence in favour of the storage function. Today it is generally accepted that the main function of the seminal vesicle is secretory. Bulk is added to the seminal fluid which aids the mechanical transfer of the spermatozoa through the urethra in the course of ejaculation, and provides a substrate which can be utilized by ejaculated spermatozoa. Recently Battke (2) did some experiments using radioactive material and showed that the seminal

Fig. 1. Upper: control. Lower: one week after the ligation of the right seminal vesicle. The seminal vesicle swelled and the dye remained concentrated in the ligated side

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vesicle had the ability to absorb certain substances. Many reports ascribed the rapid disappearance of contrast medium from the seminal vesicle after instillation to a function of absorption. Pereira (3), however, maintained that disappearance of contrast medium was not due to the absorption but to the excretory function of the seminal vesicle.

The present study was undertaken to clarify these problems.

Materials and Methods

Ten sexually mature male rats (Wistar-rat, 90-220 days old) were used. After a midline laparotomy under anaesthesia with Thiopental 50 mg/kg i. m. the seminal vesicles were exposed. For the ligation experiment, the seminal vesicle was bound with ooo silk at its neck, excluding the blood vessels. For the radiological experiments, 0.2 ml water-soluble contrast medium (Urovision: 2, 4, 6-triiode-3, 5-diacetylamine benzol acid) or oil contrast medium (Lipiodol Ultra Fluid: iodated poppy oil) was injected directly into the seminal vesicle. In another experiment, 0.2 ml dye (Cystochrome: Chemosa Union-Ag, 5028) was injected in a similar manner. The wound was closed with ooo catgut. The operation was performed with aseptic precautions.

In human cases, two patients (61 and 62 years old) who were admitted for prostatic hypertrophy

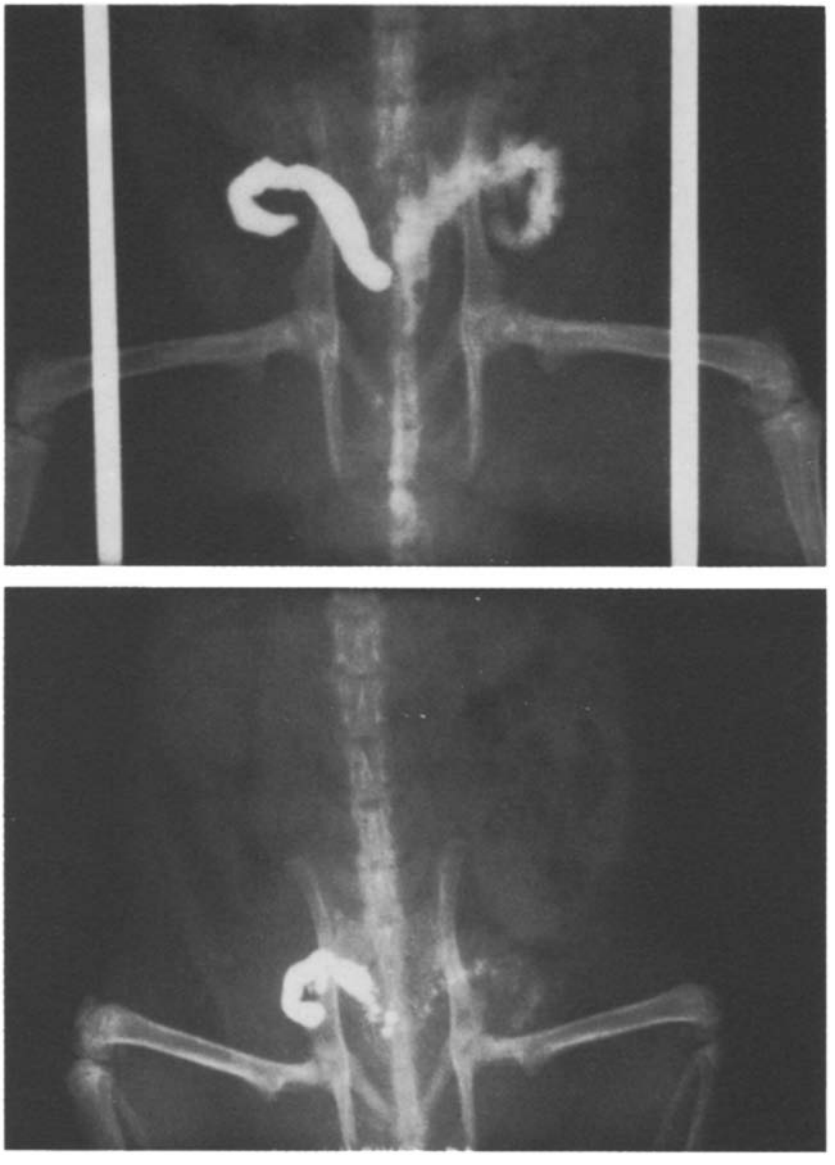

Fig. 2. Upper: control. Lower: three days after the injection of an oil contrast medium into the left and a water soluble contrast medium into the right seminal vesicle. The water soluble contrast medium almost disappeared three days after the injection

were operated upon and at the same time a seminal vesiculogram was performed. They had neither urinary infection nor sexual disorders preoperatively. Under local anaesthesia both vasa deferentia were exposed carefully in the scrotum and 2 ml of contrast medium was injected into the seminal vesicle through the vas deferens. Control X-ray film was taken immediately after the operation.

Results

Ligation and dye injection in rats. As shown in Fig. 1, the ligated right seminal vesicle one week after the operation definitely became swollen compared to the non-ligated side, due to accumulation of its characteristic fluid. This result is compatible with the consideration that the main function of the seminal vesicle is secretory, and it seems to occur continously. On the ligated side, the dye remained relatively concentrated compared to the non-ligated side. This suggests that the disappearance of the dye from the organ might be attributed mainly to secretory function, the dye seemed to be expelled with secreted seminal vesicular fluid into the urethra, even though part of it is absorbed. The fact, however, that a decrease in contrast density was recognized even on the ligated side suggests that it might be partly due to the absorptive function of the organ.

Absorbability of a contrast medium in human and in rat. The vesiculogram (Fig. 2, upper) of the rat

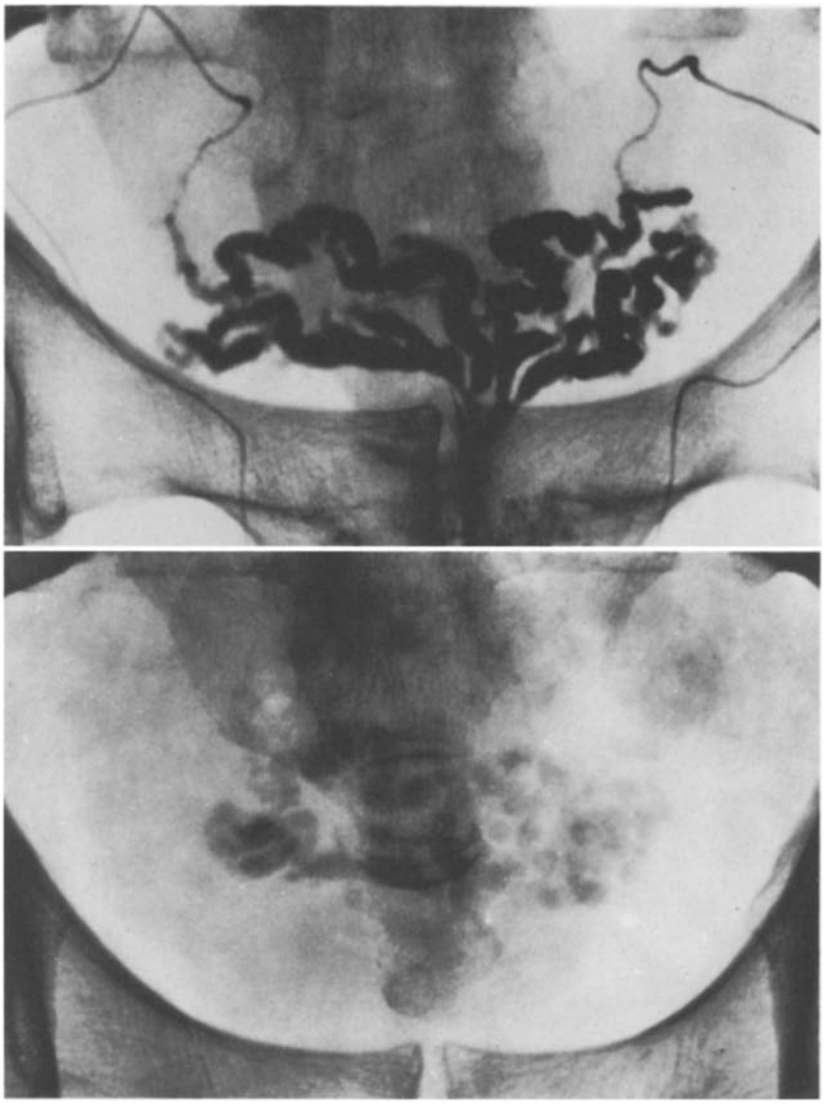

Fig. 3. Vesiculogram with a water soluble contrast medium in a human. Upper: control. Lower: three days after the injection. The contrast medium almost disappeared after three days

shows the watersoluble contrast medium in the right seminal vesicle and the oil contrast medium in the left side. Three days later the water-soluble contrast medium had almost disappeared from the organ, while the oil contrast medium remained in abundance (Fig. 2, lower). The oil contrast medium could even be observed two months after the injection, although it remained slightly at the distal end of the seminal vesicle.

The time course of disappearance of the contrast medium was almost the same in humans. As shown in Fig. 3, a water soluble contrast medium could hardly be recognized three days after injection. However, as shown in Fig. 4, enough oil contrast medium remained to distinguish the whole seminal vesicle. Only a small quantity of the medium was expelled from the proximal end and the ampulla.

The results show that a water-soluble material could be easily absorbed from the seminal vesicle and a non-water soluble material seemed not to be absorbed but gradually expelled with seminal vesicular fluid.

Discussion

The results of the present experiments indicate that the seminal vesicle has both absorptive and excretory function and that the disappearance of a water-soluble contrast medium is mostly due to absorptive function of the organ. Since it almost disappeared within three days while the oil contrast medium remained more than two months after the instillation, it seems likely that water-soluble

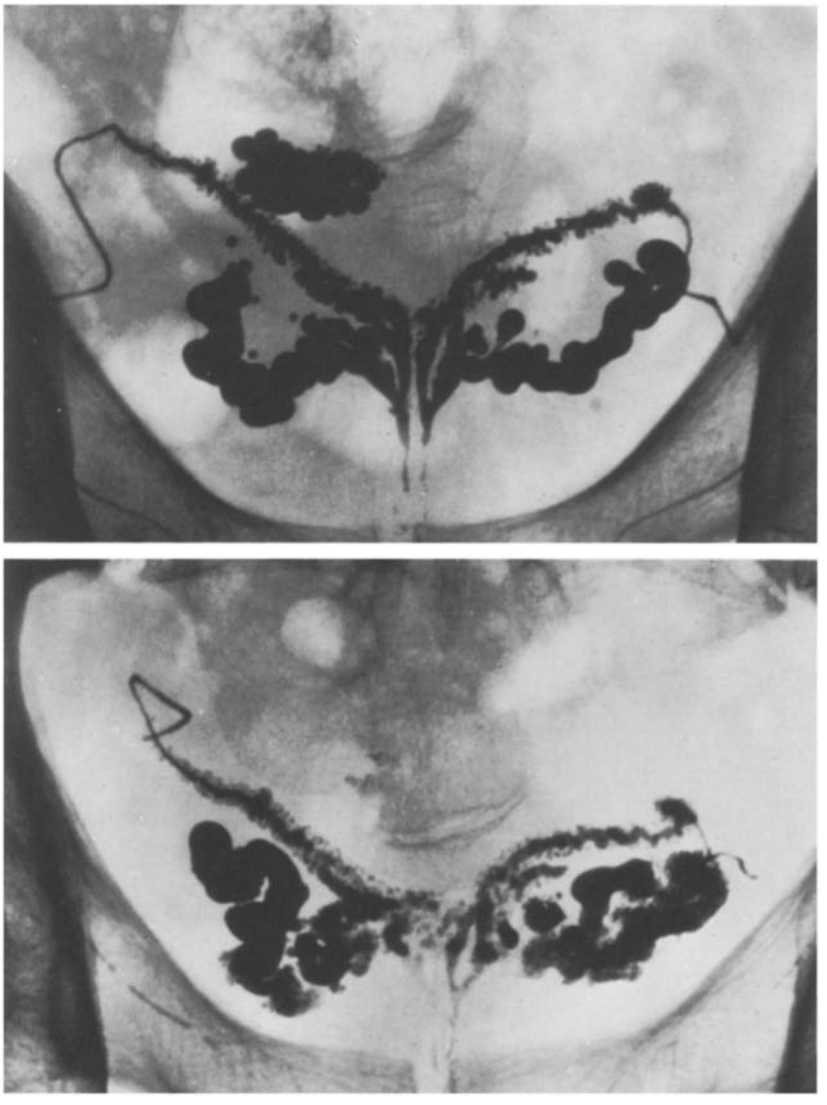

Fig. 4. Vesiculogram with an oil contrast medium in a human. Upper: control. Lower: three days after the injection. The contrast medium remained in abundance in the seminal vesicle

materials are generally absorbed through the seminal vesicle. Battke (2) has demonstrated that Fe-ammonium citrate, Bengal red, I_2 and Hg-Neohydrin are easily absorbed through the seminal vesicle.

The results of ligation experiments suggest that the seminal vesicular fluid is excreted continuously. The oil contrast medium seems to be expelled with vesicular fluid into the urethra, which means that some watersoluble medium is expelled in the same way.

Some discrepancies in the experimental data concerning seminal vesicle function can be attributed to the different contrast media employed. Periera (3) concluded in his work that the contrast medium was expelled and not absorbed by the organ. He used Neo-iodipin (R) (diiodated stearinic acid ethylester), which is an oil contrast medium. On the contrary, Lindblom and Romanus (4) used a water-soluble, high fluid triiodated contrast medium and described that the contrast medium was generally reabsorbed within three hours. It is apparent that their conclusion was based upon a partial observation. The present results suggest further that the time course of disappearance of the contrast medium might reflect a functional disorder of the seminal vesicle and contribute to a differential diagnosis in diseases of the organ.

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