Case #150

NAME Educational Activities Committee

Case provided by:
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A 78-year-old male with a history of anxiety and depression was found dead in his backyard approximately one hour after last being seen by his wife. His depression had recently worsened, with refusal to eat or attend a scheduled medical appointment. There was no history of suicidal ideation or prior suicide attempts, and no suicide note was identified. The body was found with a firearm partially clutched in the left hand. A spent cartridge case with a matching hammer imprint on the base rim was recovered from the chamber. A 0.7 cm in diameter circular entrance gunshot wound with a narrow abrasion collar of uniform width was centered within a 0.5 cm wide circular zone of soot on the right temple, without stippling.

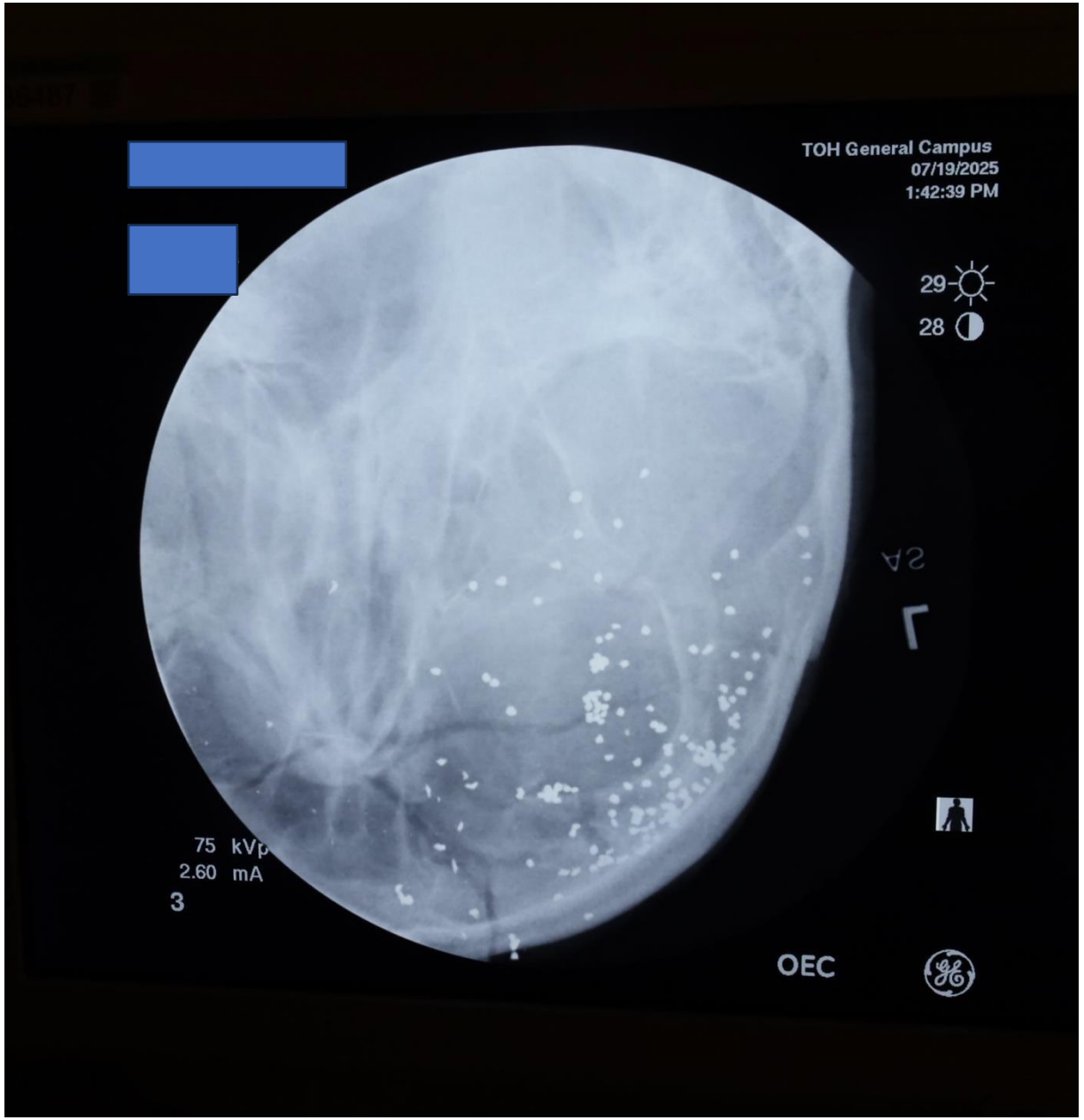
Which combination of firearm and ammunition could account for the gunshot wound features shown in the photographs?

A. .410 gauge shotgun; birdshot.

B. .20 gauge shotgun; buckshot.

C. .22 caliber rifle; snake shot.

D. 9mm Luger handgun; Glaser Safety Slug.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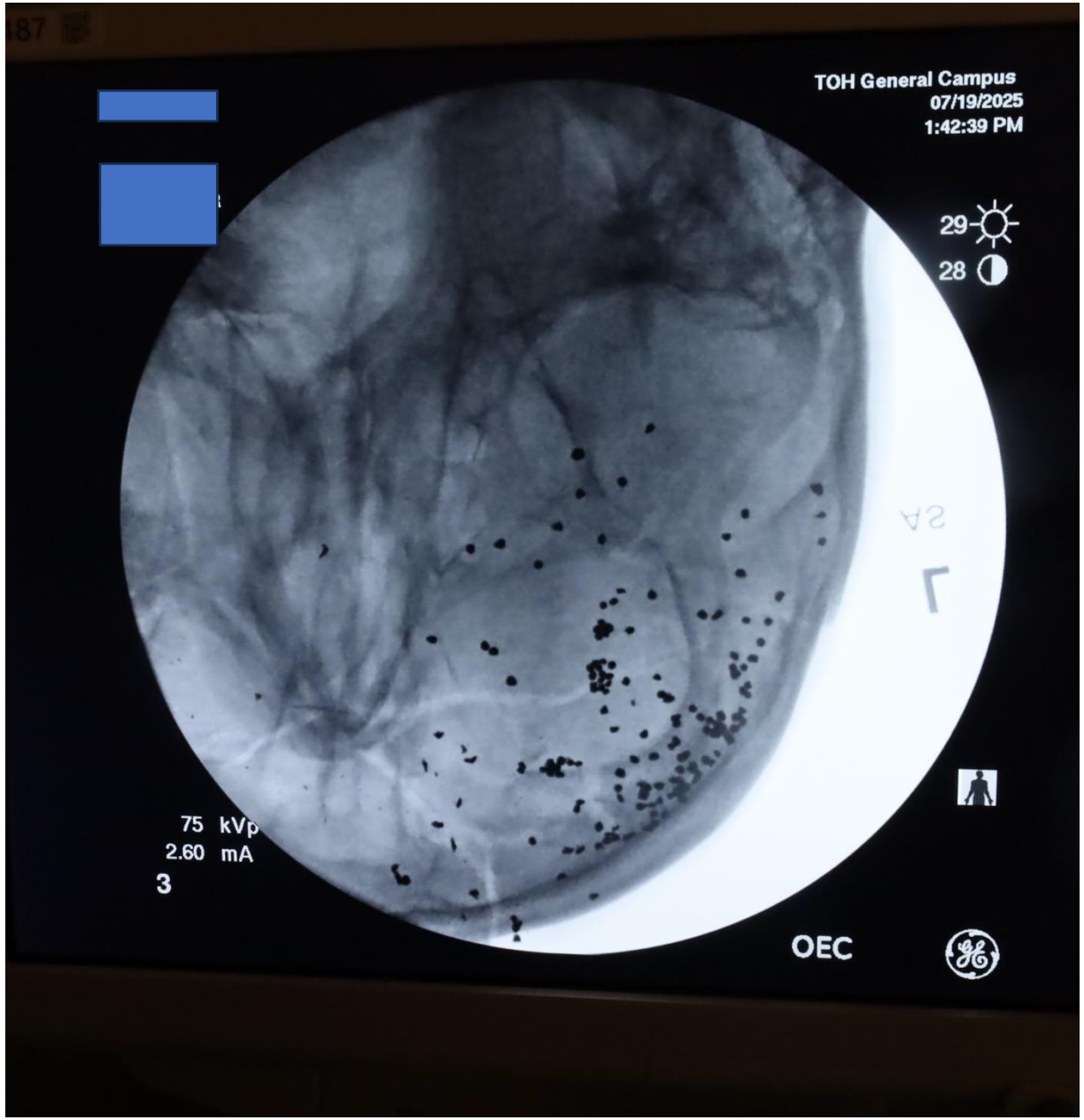
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Answer...

C. .22 caliber rifle; snake shot (*Correct: 49.2%)*

The images of the wound depict a 0.7 cm diameter circular entrance gunshot wound defect with a narrow uniform abrasion collar within a uniform 0.5 cm wide margin of soot. Interpretation of the wound features indicate a contact entrance gunshot wound that was caused by a caliber of ammunition that is smaller than the diameter of the smallest possible contact entrance shotgun wound (*which is the .410 gauge shotgun that equates with the bore diameter of 10.4 mm or 1.04 cm*). As such, a conventional shotgun can be excluded as the causative firearm. The diameter of a .22 caliber cartridge is 5.6 - 5.7 mm (0.56 – 0.57 cm).

The positive and negative digital radiographs of the head illustrate the classic "snow storm" pattern of intracranial shot pellets but of a size that is smaller than both birdshot and buckshot.

Therefore, **the combination of the discordant pathological and radiological features of this firearm injury suggest a mismatch between the expected classic weapon and ammunition which can only be explained through discharge of a miniature shotgun cartridge from a small caliber, non-shotgun firearm as can occur with use of a snake shot ammunition from a rifled firearm (handgun or rifle).**

Snake shot Ammunition

Snake shot ammunition, also called **rat shot** or **dust shot**, is a type of specialty ammunition that was developed for use in firearms with rifled barrels (handguns and rifles). It consists of an extremely small shotgun cartridge (shotshell) that is loaded with tiny lead or steel shot pellets instead of the conventional single lead bullet. Akin to conventional shotgun cartridges, the snake shot shotshell cartridge consists of a plastic wad or capsule that is filled with **small lead or steel pellets usually of No. 9 or No. 12 size.**

Snake shot/rat shot ammunition effectively converts a rifled bore firearm into a miniature shotgun and is ideally suited for use in revolvers, derringers, .22 caliber long rifles, .38 Special and .357 Magnum handguns.

It is used for close-range control of common pests such as snakes, rodents and other small animals which accounts for the more common designation of **snake shot or rat shot.** Its efficacy is restricted to shorter ranges of fire of the order of 1-3 metres (3-10 feet).

The most common snake/rat shot cartridges is loaded with No. 12 shot for use in the .22 Long Rifle, .22 Magnum, .38 Special, 9×19mm Luger, .40 Smith & Wesson, .44 Special, .45 ACP, and .45 Colt.

Snake shot pellets typically range from **0.05 - 0.08 in. (1.27 mm - 2.03 mm)** in diameter.
Birdshot pellet diameters range from **0.05 - 0.23 in.(1.27 mm to 5.84 mm) indiameter.**
Buckshot pellets generally range from **0.24 - 0.38 inches** (approx. 6.1 mm - 9.7 mm) in diameter

Snake shot ammunition

Example of small caliber (.22) snake shot ammunition broken into components including the plastic cap, shot, and small cardboard wads.
Photo provided by Dr. Reade Quinton, Mayo Clinic Rochester.

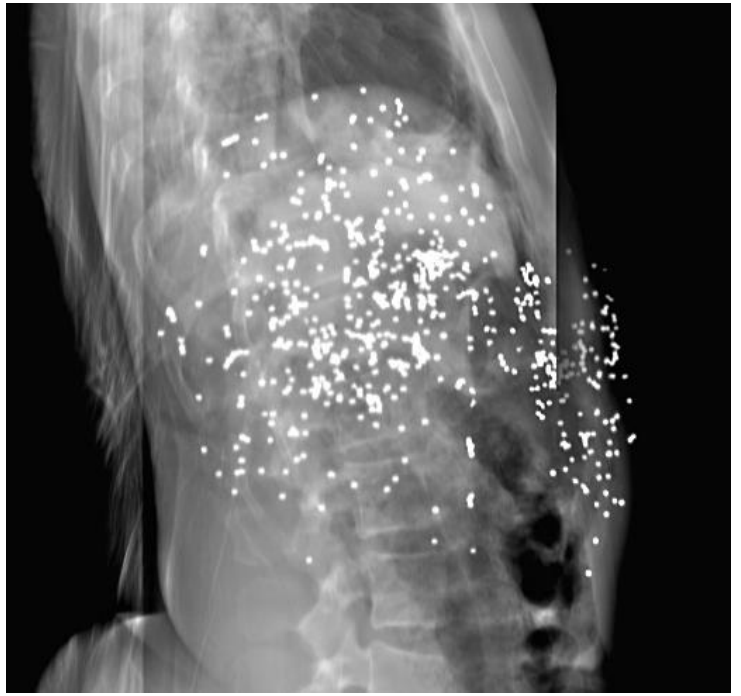
Other responses…

A. .410 gauge shotgun; birdshot (*Incorrect: 18.6%)*

Birdshot consists of small spherical pellets, lead or steel, loaded in multiples within a shotshell for hunting birds and small game.

In this case, the diameter of the defect of the entrance gunshot wound is much too small to have been caused by muzzle contact discharge from a .410 gauge shotgun, which has a bore diameter of 10.41 mm (1.041 cm).

Moreover, the positive and negative digital radiographs of the head illustrate the classic "snow storm" pattern of shot pellets of a size that is smaller than birdshot, consistent with fine or dust shot rather than standard birdshot.



Photos courtesy of the Cook County Medical Examiner's Office

B. .20 gauge shotgun; buckshot (*incorrect: 2.7%)*

Buckshot consists of large spherical lead pellets loaded in small numbers within a shotshell, used for larger game such as deer and in defensive and law enforcement loads.

In this case, the diameter of the circular defect of the entrance wound is much too small to have been caused by muzzle contact discharge from a 20 gauge shotgun, which has a bore diameter of 15.62 mm (1.562 cm).

Moreover, the radiographs of the head illustrate the classic "snow storm" pattern of shot pellets of a size that is extremely small, far smaller than buckshot.

Photos courtesy of the Cook County Medical Examiner's Office

Buckshot

Birdshot

GAUGE BORE DIAMETERS

Gauge	Bore Diameter (in)	Bore Diameter (mm)
10 Gauge	.775"	19.69mm
12 Gauge	.725"	18.42mm
16 Gauge	.665"	16.89mm
20 Gauge	.615"	15.62mm
28 Gauge	.545"	13.84mm
.410 Bore	.410"	10.41 mm

D. 9mm Luger; Glaser safety slug (*incorrect: 29.5%)*

Glaser Safety Slug ammunition is a frangible projectile that was developed in the 1970s to reduce overpenetration and ricochets in close-quarters shooting. Frangible bullets are designed to disintegrate into tiny particles upon target impact to minimize their penetration of other objects. They are less likely to cause injury or damage to persons and objects distant from the interest of target impact.

Each round consists of a core of compressed #12 lead shot contained within a copper jacket and sealed with a polymer ball.

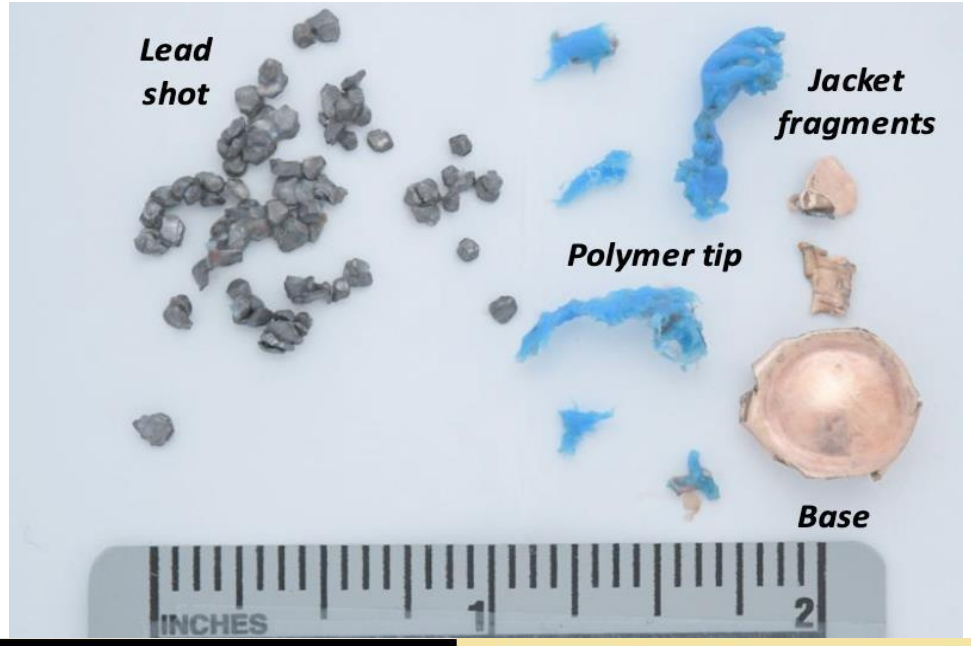
Upon discharge, the projectile behaves like a conventional bullet and perforates the skin as a single unit, following which the lead pellets emerge from the core and disperse radially within the tissues in a shotgun-like pattern to produce a characteristic distributed wound cavity.

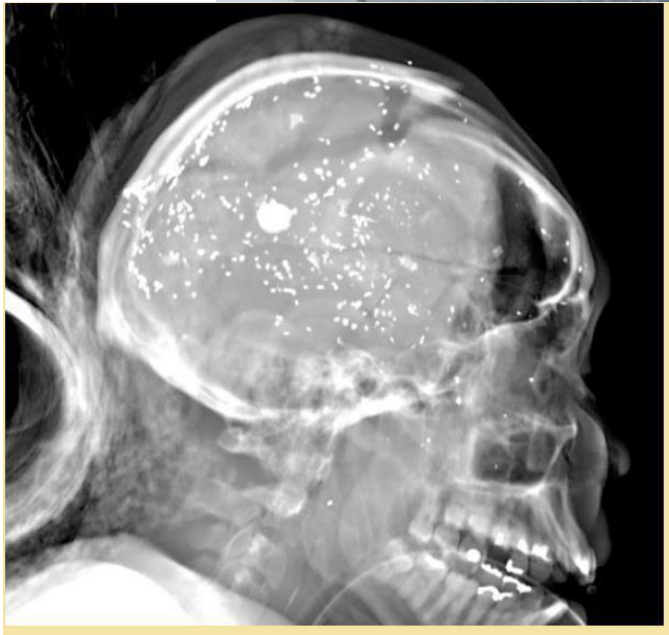
Unlike intermediate and distant range discharge of conventional shot pellet cartridges from conventional shotguns, individual pellet wounds would never occur on the skin surface with Glaser Safety Slugs unless the projectile first passes through an intermediary target.

Glaser rounds are readily identifiable on postmortem imaging by the simultaneous presence of fragmented copper jacketing and multiple discrete lead pellets.

This option is incorrect because the digital radiographs of the head do not contain fragments of a copper jacket.

9mm Luger; Glaser safety slug





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