SEARCHING FOR METHOD IN THE MADNESS: PAKISTAN, TACTICAL NUCLEAR WEAPONS AND THE *NASR* MISSILE

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2015

Pakistan's military planners have for a long time determined that they need to be prepared to escalate a military conflict with India into a nuclear war through the first use of nuclear weapons. Over the past decade, this has included preparing for using nuclear weapons on the battlefield against Indian armed forces crossing the border. They seem to believe that a credible threat to use nuclear weapons in this manner will deter such an attack.

In this article we explore briefly how Pakistan's generals have thought about the role of nuclear weapons in the conflict with India and how some of their Indian counterparts anticipated possible use by Pakistan of such weapons on the battlefield. The article then looks at some of the issues surrounding the limited utility of such tactical nuclear weapon against advancing Indian armoured forces and the most recent means Pakistan's nuclear planners have sought to achieve this goal: the development and deployment of the new short-range *Nasr* tactical missile that had its first reported successful test launch on 19 April 2011 and is declared to be capable of delivering nuclear weapons at ranges of up to 60 km (Inter-Services Public Relations, 2011).

In 2015, the former head of Pakistan's Strategic Plans Division retired General Khalid Kidwai claimed that "the main purpose of… the *Nasr*s… is to ensure that war will not break out" with India and in particular *Nasr* is intended to close the "space for conventional war" (Kidwai, 2015). The use of tactical nuclear weapons such as *Nasr* may not prove decisive, however, but may still be catastrophic. The article concludes by exploring alternatives.

Going Nuclear

The decision to acquire nuclear weapons was taken in Pakistan soon after the military defeat by the Indian Army and the consequent fall of East Pakistan in December 1971. At the now famous Multan meeting in January 1972, the new President of Pakistan Zulfikar Ali Bhutto invited scientists to help make nuclear weapons. According to one participant, "The one and only question Bhutto repeatedly asked the scientists was: how could they help meet the threat to Pakistan's security posed not only by India's overwhelming conventional weapons superiority but lately also by a growing nuclear challenge from across the border?" (Babar, 1999).

By seeking to acquire nuclear weapons, Pakistan's planners could have imagined attacking Indian cities in response to conventional attack as well as the use of nuclear weapons on the battlefield to stem such an attack. As early as 1958, General Ayub Khan, who ruled Pakistan from 1958 to1969, was reading articles on "Pattern for Limited (Nuclear) War," published in Britain's Royal United Services Institution Journal. These articles, inspired by Henry Kissinger's 1957 book *Nuclear Weapons and Foreign* Policy, argued for a strategy based on conventional forces and tactical nuclear war fighting rather than limiting use of nuclear weapons to city destruction (which was seen as unrealistic given that the opponent also had nuclear weapons). By the 1970s, tactical weapons were being deployed by the United States, Soviet Union, United Kingdom, and France.

Pakistan has sought an option of delivering nuclear weapons, by aircraft since the late 1980s. For seven to eight years between 1985, when Pakistan claims to have had developed nuclear weapons, and 1998 when Pakistan tested its first nuclear capable missile, the only choice for using nuclear weapon was dropping it by air. It is claimed (Khan, 2012: 185-186) that Pakistan began design of a "deliverable bomb" in 1988 that was tested by dropping it from F-16 fighters and it was only "in May 1995 PAEC finally succeeded in getting the desired result after several years of aerial drop cold tests." This goal was to have the bomb detonate at 500 meters above the ground and these practice drops including rehearsing "low-level" attacks suitable for use on a battlefield (Khan, 2012:187).

There is evidence that by the early 1990s Indian military planners recognized that Pakistan might use nuclear weapons against Indian conventional forces, and they have been preparing for such a possibility ever since. In 1993, former Indian Army Chief General K. Sundarji wrote a fictionalized account of an India-Pakistan war based on the premise of Pakistan initiating a nuclear first strike against India. The scenario includes Pakistan using nuclear weapons on Indian conventional forces on the battlefield "as a result of an Indian conventional counter-offensive into Pakistan in the plains sector as a result of Pakistan's action in Jammu and Kashmir" (Sundarji, 1993: 215). The novel includes detailed descriptions of the effects of nuclear weapons use against various military units, sites and other targets in India.

Outside analysts saw a similar possibility. In his book on the Pakistan Army, Stephen Cohen wrote that "Pakistani nuclear planners will have the choice of utilizing their nucler force for tactical or strategic ends. That is, nuclear devices can be used against massed troop concentrations" (Cohen, 1998: 155).

After India and Pakistan tested nuclear weapons in 1998, Pakistan's doctrine for use of nuclear weapons was assumed to include countering Indian conventional forces (Lodhi, 1999). Indian military analyst Raja Menon in 2000 imagined a scenario of India reacting to attacks from Pakistan-based terrorist groups by launching a punitive surgical strike across the border, and Pakistan using nuclear

weapons to counter an otherwise unstoppable Indian conventional incursion into Pakistani territory (Menon, 2000).

The current Pakistani idea of using nuclear weapons on battlefield is claimed to be a response to the Indian army adoption of a doctrine dubbed "Cold Start" starting in 2004 (Ladwig, 2007). Pakistani military planners describe this doctrine as "pre-programmed, predetermined, shooting from the hip posture… with independent integral battle groups, of about armored brigade size... trying to hit Pakistan within 48 to 96 hours with tactical formations, eight to nine of them simultaneously" (Kidwai, 2015). According to General Kidwai, "The doctrine was meant to be unleashed against us… Therefore in order to deter the unfolding of operations under the doctrine Pakistan opted to develop a variety of short range, low yield nuclear weapons, also dubbed tactical nuclear weapons" (Kidwai, 2015).

Effects of Tactical Nuclear Weapons

It is not hard to show that the battlefield use of nuclear weapons is largely ineffective in destroying or disabling large numbers of armoured vehicles if the weapons have yields of up to a few tens of kilotons yield, i.e. comparable to the bombs used by the United States against the cities of Hiroshima and Nagasaki (Nayyar and Mian, 2010). This simple fact is one reason why the United States and Soviet Union needed to field thousands of tactical nuclear weapons.

Nuclear weapons cause three effects on the target and its surroundings: a blast wave of very high pressure which can damage tanks, armoured vehicles and artillery; an intense heat wave which can cause inflammable material like gasoline to catch fire but may not destroy or damage tanks; and, radioactivity that can cause debilitating sickness in military personnel. One can estimate each one of these out to relevant distances with a fair amount of accuracy. Table 1 shows the effects of tactical nuclear weapons of yields 1, 5 and 10 kilotons of TNT equivalent exploding at a height of 400 meters over an advancing tank formation with average distance of 100 meters between adjacent tanks. It gives estimates for the number of tanks destroyed by the blast and the crews disabled by the radiation. The heat from the explosion would not have lethal impact on either armoured vehicles or their crew.

Yield (kiloton)	Number of tanks destroyed by blast	Number of tanks disabled by radiation
15	64	360
10	48	290
5	32	190
1	10	110

Table 1: The blast and radiation effects of nuclear weapons of various yields against tanks separated by 100 meters. Adapted from (Nayyar and Mian, 2010).

The use of large numbers of nuclear weapons on the battlefield especially in the Pakistan-India border areas also could cause significant damage to the local population if they are not evacuated in time, and to the local environment (Sankaran, 2014).

What then can Pakistan realistically hope to gain from using nuclear weapons on the battlefield? One option would be for a warning shot to serve as a signal to India from Pakistan's generals that unless India withdrew its forces the next step was a major nuclear attack on targets in India. The use of one or more tactical nuclear weapons also could be intended to attract international attention and trigger efforts to dissuade India from any further escalation and to withdraw its forces. Pakistani military planners may assume that these possible outcomes from the use of tactical nuclear weapons would suffice to counter any Indian plans for a punitive conventional strike on Pakistan.

The *Nasr* System

Pakistan has developed a range of missiles that it claims can carry nuclear weapons including short and long range ballistic missiles and ground and air-launched cruise missiles. All the missiles are named *Hatf* (meaning "doom" in Arabic, but often mistranslated as 'vengeance'). The missiles are numbered from I to IX, with each missile type also having a specific name.

Pakistan's nuclear missiles are managed at the operational level by the Strategic Force Commands of the Army, the Air Force and the Navy, which fall under the National Command Authority and its Strategic Plans Division. The surface to surface missiles, including *Nasr,* and the ground-launched cruise missile *Babur*, are under the Army Strategic Force Command. *Babur* may also have been given to the Naval Strategic Force Command to be deployed on warships. The Naval Strategic Force Command conducted a test of this missile on 26 February 2014. The air launched cruise missile *Ra'ad* together with the Mirage fighter planes that deliver it fall under the Air Force Strategic Force Command.

The *Nasr,* also known as Hatf-9, is reported to have a range of 60 to 80 km, the shortest of any of Pakistan's current missiles. It is launched from a truck-mounted multi-tube launcher. It initially had two tubes, but later models show a four tube launcher. In 2013, this missile was tested twice; once on 10 February, shooting two missiles simultaneously, and then on 4 November, launching 4 missiles in quick succession from a four barrel launcher. It is hard to imagine any utility of firing a salvo of four tactical nuclear weapons at one point on the battlefield. A more likely scenario would be waiting to see the response after hitting one section of advancing forces before taking up any follow-up targeting. It is not clear how easily the *Nasr* launcher tubes could be reloaded and if this can be done on the battlefield.

Given that *Nasr* is described as having a "low-yield," it is possible the nuclear warhead may be in the fraction of a kiloton to a few kiloton yield range. As seen above, such low yields limit the damage that can be inflicted on armoured forces, and it would require a large number of such weapons to be used to cause significant destruction to brigade-sized armoured forces of the kind envisaged under Cold Start.

From photographs, the diameter of *Nasr* has been estimated (Nagappa, Vishwanathan and Malhotra, 2013) to be between 300 and 350 mm (12–14 inches), with a warhead section of 1600 mm length. This makes mounting nuclear weapons on it very challenging and limits the size of warhead it can accommodate, leading some analysts to doubt if Pakistan could have made a nuclear warhead small enough to fit into such a narrow missile (Lewis, 2011). It has been suggested (Nagappa, Vishwanathan and Malhotra, 2013) that the small diameter of *Nasr* could allow only a very specially designed warhead, which would need perhaps twice the amount of plutonium of a more typical spherically symmetric implosion device (4-5 kg). This would put a heavy demand on Pakistan's plutonium stockpiles, estimated to be about 150–200 kg as of 2014 (International Panel on Fissile Materials, 2015).

The accuracy of *Nasr* is unknown. The maximum altitude of a missile on a normal trajectory is typically about a third of its range. Given that *Nasr*'s range is only 60 to 80 km, the maximum height it will attain in its flight is about 20-30 km. This means that its trajectory remains endo-atmospheric and subject to atmospheric drag, but it will not suffer severe re-entry uncertainties like longer range missiles. However, *Nasr* may not be more accurate than a simple unguided rocket.

The missile is mobile but it may only be road mobile and not capable of off-road maneuvers or travel on rough terrain. It is short range therefore at the time of deployment it will need to be taken out of storage sites and transported to the battle zone, most likely within 60-80 kilometers of the border. The *Nasr* transporter-erector launcher (TEL) appears easy to distinguish from other vehicular traffic and this may make *Nasr* batteries a possible target for Indian forces.

To avoid being targeted by the enemy, the missile launcher would presumably hurry away after firing a missile or a salvo of missiles. The missile has been described by the Pakistan army as being able to "shoot and scoot." Since the Pakistan border areas with India are not known to have a high quality road network, this not only limits the mobility of the launcher but also makes it more vulnerable to accidents or mishaps. An accident like crashing into a roadside obstruction or falling into a ditch could disable a launcher or result in detonation of conventional explosives surrounding the core of the nuclear weapon, destroying the weapon and dispersing the nuclear material in the warhead or potentially a nuclear explosion (Mian, Rajaraman and Ramana, 2002).

Trucks carrying nuclear weapons have crashed in other countries. An official record of British nuclear weapon accidents since 1960 includes the 1987 accident in which a Royal air Force nuclear weapon transporter with two nuclear weapons on board swerved to avoid a car, ran off the road and rolled on to its side (Nukewatch, 2015). Similarly, in the United States, to give just one example, in 2001, a transporter carrying eight US cruise missiles "slapped the side of the bridge, veered off the highway, slid about 80 yards down a steep ravine and flipped on its side" (Richissin, Dresser and Cadiz, 2001).

As a battlefield nuclear system, *Nasr* would need to be integrated into battle plans at the level of the Corps Commanders of Pakistan's Army. These senior generals command the tanks and artillery divisions that are the main fighting forces of the army and would make the first contact with Indian forces crossing the border. The decision to deploy and launch *Nasr* would presumably come from Pakistan's National Command Authority in response to a request from a Corps Commander facing losses on the battlefield and unable to hold back the Indian advance. This has led to worries about the inevitable problems associated with pre-delegation of command and control over nuclear weapons to local commanders.

Nasr is not the first short-range surface to surface missile Pakistan has tested. Pakistan's first reported missile test was conducted in 1989 and involved the Hatf-I, a 70 km range missile with a payload of 500 kg. There was speculation that it was "intended for short range delivery of nuclear weapons" (Beri, 1998: 192). Subsequent short range missiles were Hatf-2 (Abdali) and Hatf-3 (Ghaznavi), both potentially capable of carrying out the kind of nuclear attack that is envisaged for *Nasr*. Abdali has a range of less than 200 km, and a body diameter of about 55 cm (22 inches) that would allow for a small nuclear weapon. The 300 km range Ghaznavi missile has a wider body and a larger payload capacity, making it even more suitable for delivering nuclear weapons and perhaps ones with larger yields.

Pakistan has several other options; targeting with the ground launched cruise missile *Babur*, or with the air-launched cruise missile *Ra'ad*. *Babur* has a diameter estimated to be about 50 cm (20 inches), sufficient to carry a compact nuclear weapon (Janes, 2015). It has undergone the largest number of tests among Pakistani missiles so far. *Ra'ad* has been flight tested four times so far and is launched from Mirage III fighter aircraft. A simpler option for battlefield situation would be dropping a nuclear bomb from an air force plane.

Alternatives

It is unclear why Pakistan has chosen *Nasr* as its key tactical nuclear weapon system or what purpose it can effectively serve. Nasr will most likely not have a significant or decisive effect on battlefield outcomes.

Pakistan's nuclear planners anticipate that the threat of early nuclear use on the battlefield may fail. General Kidwai (Kidwai, 2015) has argued that "if war is not deterred, then obviously some kind of a mad doctrine will come into play." This threat is intended to counter India's declared nuclear doctrine of "retaliation against a nuclear attack on Indian territory or on Indian forces anywhere" and that such "nuclear retaliation to a first strike will be massive and designed to inflict unacceptable damage" (Cabinet Committee, 2003).

Put simply, both Pakistan and India see the use of *Nasr* against conventional forces as an opening shot in a nuclear war that would escalate into an all-out catastrophic nuclear exchange of the kind characterized as Mutually Assured Destruction (MAD) during the super-power Cold War. It does not take much to realize, however, that there are possible alternatives to this logic that Pakistan and India could agree to explore.

Meanwhile, the core justification offered for *Nasr* has apparently disappeared since the Indian Army has, it seems, failed to get support for its Cold Start doctrine from political leaders (Sankaran, 2014b). In a secret 16 February 2010 cable to Washington, the United States Ambassador in Delhi, Tim Roemer, explained that "the government of Prime Minister Manmohan Singh has not publicly embraced Cold Start…. several very high level GOI officials have firmly stated, when asked directly about their support for Cold Start, that they have never endorsed, supported, or advocated for this doctrine" (Roemer, 2010).

At the same time, it is however important to note that despite insisting on the need for tactical nuclear weapons, General Kidwai admits that "there is a deterrence value within the conventional forces, the combine of the army, air force, navy has a certain deterrence value, notwithstanding the conventional asymmetries that we keep talking about. There is a healthy balance between the conventional forces on either side" (Kidwai, 2015). It is noteworthy that Pakistan has ordered over 2000 TOW anti-tank missiles from the United States since 2001 (Kronstadt, 2015).

If there exists, as Kidwai claims, a "healthy balance between the conventional forces" of India and Pakistan, it becomes hard to see the justification for the battlefield use of nuclear weapons. One possibility is that Pakistani generals imagine a long drawn out war of attrition by India that eventually wears down Pakistan's conventional capabilities. This seems unreasonable given the pace of international intervention in previous wars and crises between the two countries, especially after they acquired nuclear weapons.

Nonetheless, Pakistani leaders continue to fear the possibility of a cross border attack from India. This Pakistani fear was evident recently after the Indian incursion into Myanmar in a punitive strike on camps of the rebels who had earlier ambushed an Indian army convoy in the North Eastern state of Manipur (BBC, 2015). Indian information minister, Rajyavardhan Rathore, said the message to

other countries was that "We will strike when we want to," which led Pakistan's interior minister to declare "Those who are contemplating any kind of adventure in Pakistan must know that they will get a bloody face in the process" (Craig and Gowen, 2015). The Indian Defense Minister Manohar Parrikar declared that the operation represented a new defence posture and a change in India's mindset, raising the prospect of possible action against militant camps in Pakistan used to attack India (Times of India, 2015). It is easy to imagine such a situation spiraling out of control.

The strategy-counter strategy game that India and Pakistan have been playing with each other is leading to increasing instability. At each step of escalation, both countries come out losers: India loses some of its edge over Pakistan and Pakistan moves further towards internal instability. The only way out of this recurring nightmare is for them to consider radically different alternatives. One option could be to agree to forswear actions that may lead to war, such as support for cross-border militancy and military incursions across the border, as well as subversion, blockades, and disruption of river waters (Pandey, Mian, Nayyar and Ramana, 2001).

This is not a novel suggestion. In 1949 and 1950 India offered first a no-war declaration and then a no-war pact to Pakistan. The offer was accepted by Prime Minister Liaquat Ali Khan provided there was a timetable for settling all outstanding disputes. But no timetable was agreed. The idea resurfaced in 1981, when General Zia offered a no-war pact to India, which was refused, and again when General Pervez Musharraf repeated the offer at the United Nations Millennium Summit in September 2000. The time may have come to try again.

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